

CONVAIR MODEL
MAINTENANCE MANUAL

CROSSFEED VALVES AND AUXILIARY CENTER TANK AND WING
CROSSFEED VALVES - MAINTENANCE PRACTICES

1. Removal/Installation Crossfeed Valve and Auxiliary Center Tank and Wing Crossfeed Valve

NOTE: Fuel crossfeed valves and auxiliary center tank and wing crossfeed valves are motor-operated gate valves. The replacement procedure is the same as that for the defuel valves; refer to 28-2-5, Defuel Valves.

2. Adjustment/Test Crossfeed Valve or Auxiliary Center Tank and Wing Crossfeed Valve - Functional Tests

- A. Equipment Required. External source of 115/200-volt, 3-phase, 400 cps, ac electrical power.
- B. Prepare for Functional Tests. Connect external source of ac electrical power to airplane; refer to Chapter 24, ELECTRICAL POWER.
- C. Perform Crossfeed Valve Functional Test.
 - (1) Position CROSS FEED valve control knob, on flight engineer's fuel control panel, to the valve open position (control knob line parallel with fuel circuit). Check that blue VALVE IN TRANSIT light illuminates while valve is moving from the closed to the open position, and extinguishes when valve is fully open. Check that manual operation lever on valve moves to the OPEN position.
 - (2) Position control knob to close the valve (control knob line across the fuel circuit). Check that VALVE IN TRANSIT light illuminates while valve is in transit, and that it extinguishes when valve is fully closed. Check that manual operation lever on valve moves to the CLOSE position.
- D. Perform Auxiliary Center Tank and Wing Crossfeed Valve Function Test.
 - (1) Repeat steps C.(1) and C.(2) except substitute AUX CTR TANK AND WING CROSS FEED for CROSS FEED VALVE.
 - (2) Remove external electrical power from airplane.

FUEL EMERGENCY SHUTOFF VALVES - MAINTENANCE PRACTICES

1. Removal/Installation Fuel Emergency Shutoff Valve

NOTE: Fuel emergency shutoff valves are motor-operated gate valves. The replacement procedure is the same as that for the defuel valves; refer to 28-2-5, Defuel Valves.

2. Adjustment/Test Fuel Emergency Shutoff Valves-Functional Test

NOTE: Fuel emergency shutoff valves are operated, and functionally tested, as part of the Emergency Shutoff System; refer to Chapter 26, FIRE PROTECTION.

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FUEL LINE CHECK VALVES - MAINTENANCE PRACTICES

1. Removal/Installation Fuel Line Check Valve (see Figure 201)

- A. Equipment Required - None.
- B. Prepare for Replacement of Valve.
 - (1) Defuel corresponding tank; refer to Chapter 12, SERVICING.
 - (2) Inert tank; refer to 28-1-0.
 - (3) Remove access panel.

WARNING: OBSERVE TANK ENTRANCE PRECAUTIONS; REFER TO 28-1-0.

C. Remove Fuel Line Check Valve.

NOTE: The check valves for transfer pumps in No. 2 and 3 replenishment tanks are installed downstream of the pumps on the main tank side of the bulkhead between main and replenishment tanks. These valves have no drain line; therefore, steps C. (3) and D. (5) of the following procedures are not applicable.

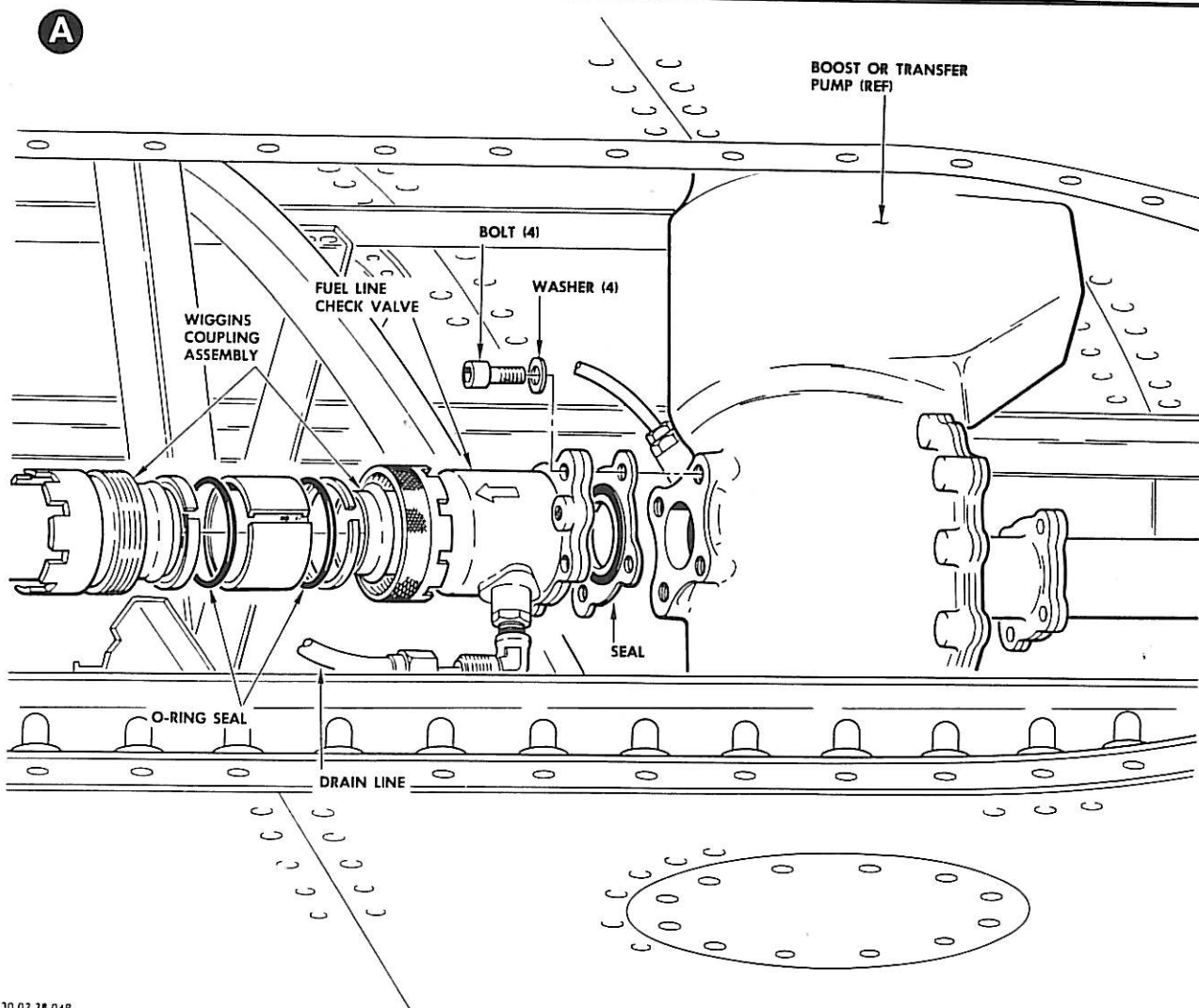
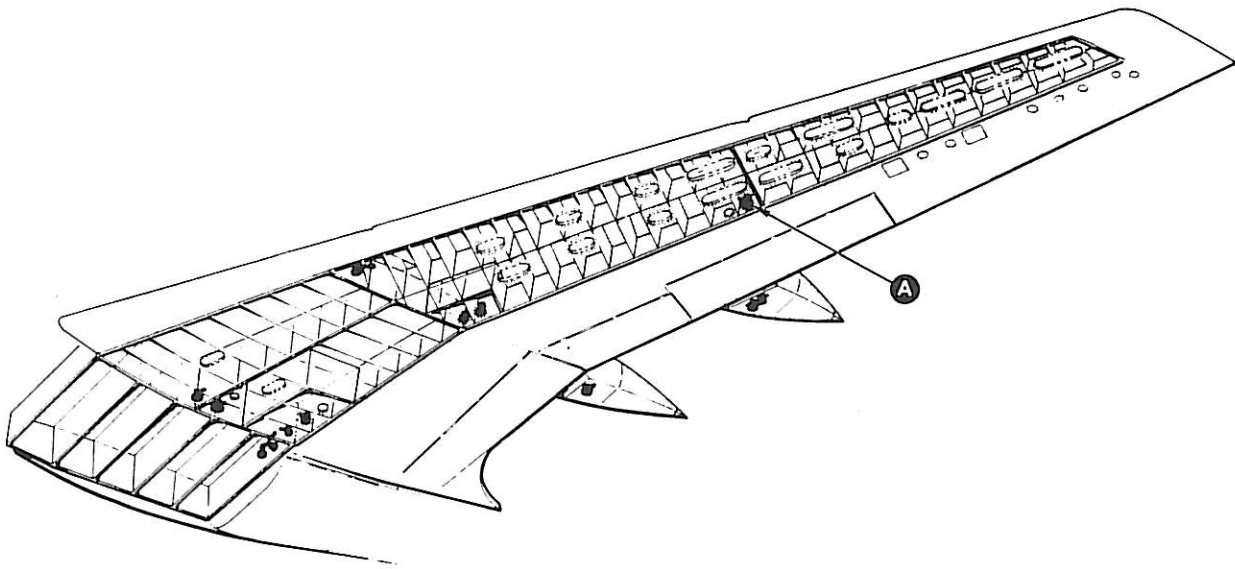
- (1) Remove drain plug and drain residual fuel from applicable pump; refer to 28-3-1. Replace drain plug and access plate after draining fuel.
- (2) Drain residual fuel from check valve through check valve's drain-flush valve; refer to 28-3-7.
- (3) Disconnect drain line from check valve; cap drain line.
- (4) Disconnect fuel outlet line from check valve by disconnecting Wiggins flex coupling; refer to 28-0.
- (5) Remove four bolts attaching check valve to pump and remove valve.

D. Install Fuel Line Check Valve.

NOTE: Check that valve flapper operates freely and seats properly before installing valve.

- (1) Clean mating surfaces of valve, seal, and pump.
- (2) Position check valve and seal at pump with TOP marking on valve up.
- (3) Install four attachment bolts.

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- (4) Connect fuel line to check valve with Wiggins flex coupling; refer to 28-0.
- (5) Connect drain line to check valve.
- (6) Clean fuel tank; refer to 28-1-0.
- (7) Refuel tank; refer to Chapter 12, SERVICING.

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DRAIN VALVES - MAINTENANCE PRACTICES

1. Removal/Installation Typical Drain Valve (see Figure 201)

A. Equipment Required - None.

B. Prepare for Valve Replacement.

(1) Defuel applicable tank(s); refer to Chapter 12, SERVICING.

(2) Inert tank; refer to 28-1-0.

(3) Remove access panel nearest valve.

WARNING: OBSERVE TANK ENTRANCE PRECAUTIONS; REFER TO 28-1-0.

C. Remove Drain Valve.

(1) Disconnect tubing from drain valve inside tank.

NOTE: If tubing also is to be replaced, mark the valve position before removing to facilitate alignment with tubing during installation.

(2) Remove six screws attaching drain valve to wing undersurface and remove valve and seal. - (If serviceable, retain seal for installation.)

D. Install Drain Valve.

(1) Thoroughly clean mating surfaces of drain valve, seal, and fuel tank.

(2) Position seal and drain valve inside tank so that valve port is aligned with drain tubing.

(3) Install six attachment screws.

(4) Connect tubing to drain valve.

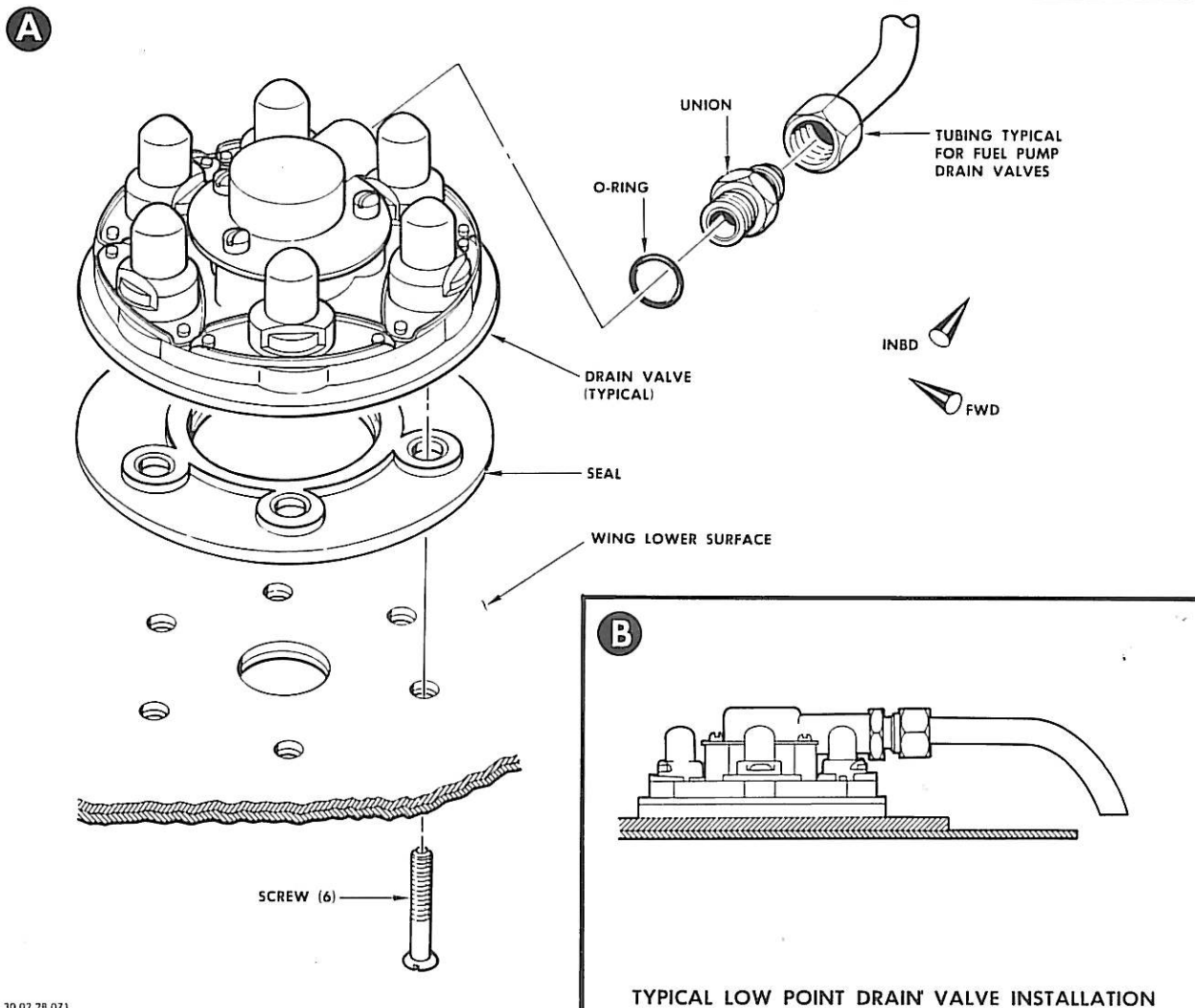
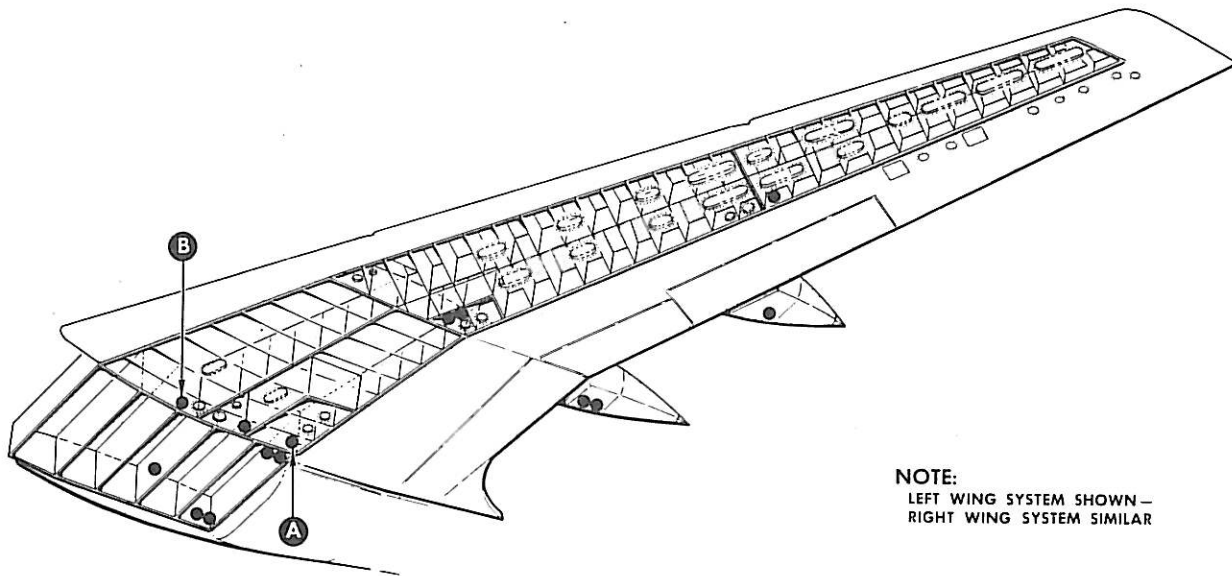
(5) Clean fuel tank; refer to 28-1-0.

(6) Refuel tank; refer to Chapter 12, SERVICING.

(7) Test valve operation with special tool, Accessory Products Co. No. 704400.

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2. Removal/Installation Drain Valve Primary Poppet (see Figure 202)

A. Equipment Required - None.

B. Remove Primary Poppet.

(1) Insert a screw driver in seat slot and unscrew seat.

NOTE: The screw driver (or a comparable flat tool) must be of sufficient width to bridge well across the seat opening.

(2) Lift spring and primary poppet from seat.

(3) Check condition of poppet's bonded seal. Discard poppet if seal appears damaged or if poppet leaked prior to removal. (Discard spring if corroded.)

C. Install Primary Poppet.

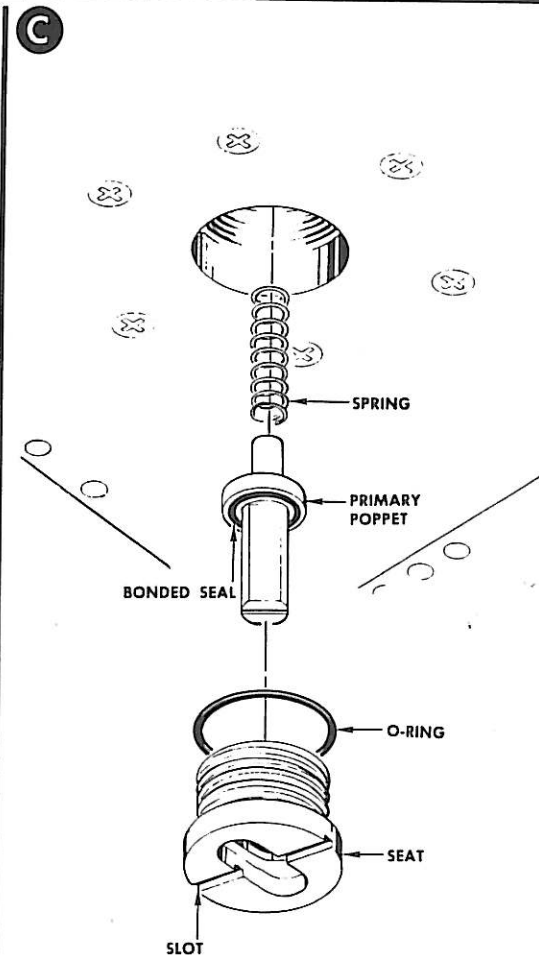
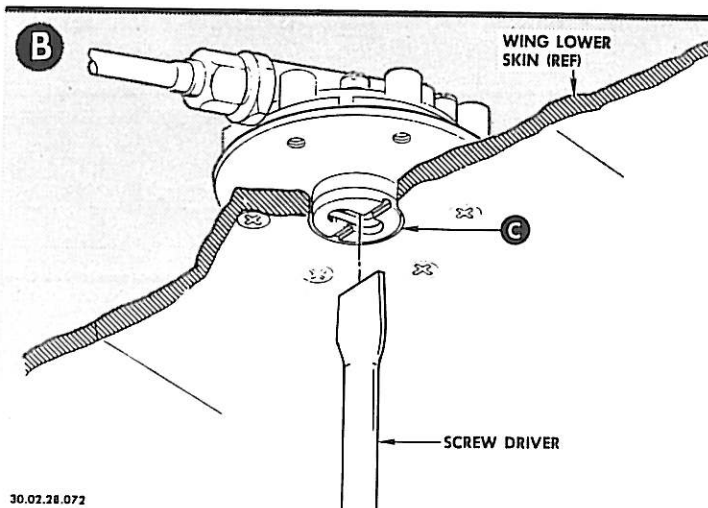
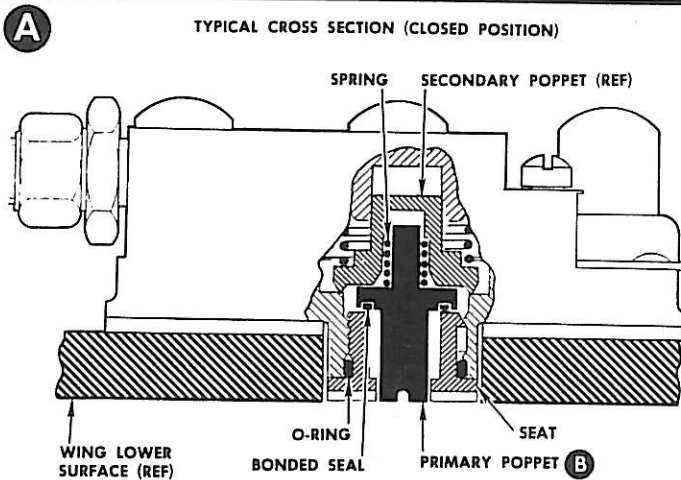
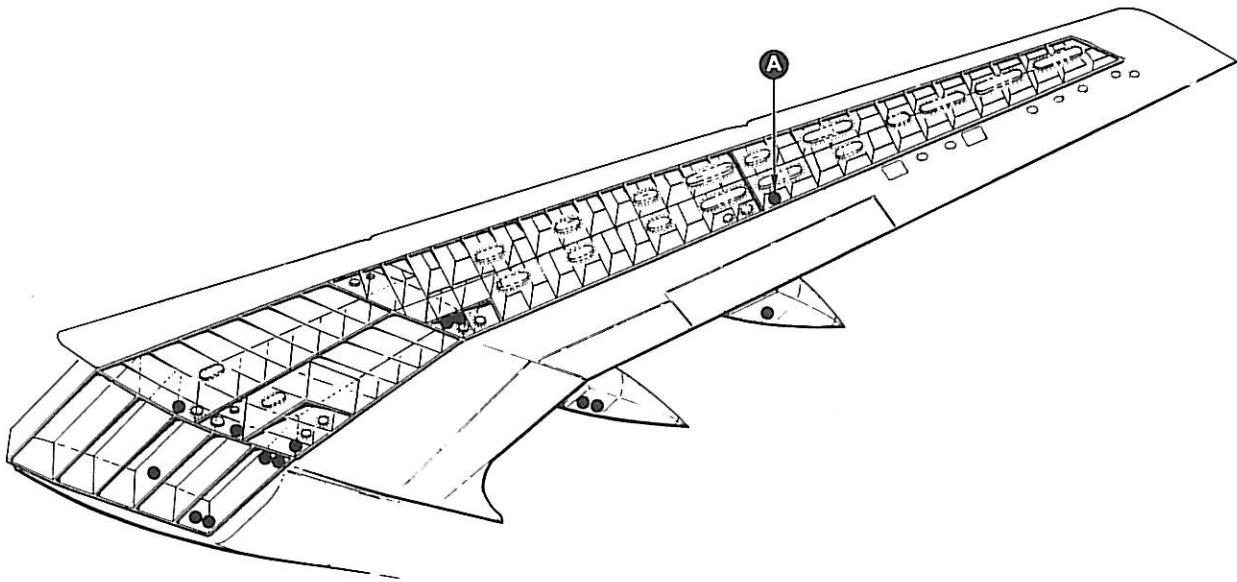
(1) Install a new O-ring on seat.

(2) Insert poppet and spring in seat.

(3) Screw poppet and seat assembly into drain valve body.

(4) Tighten seat with screw driver.

(5) Check drain valve for leakage.



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FLOAT-ACTUATED CHECK VALVES - MAINTENANCE PRACTICES

1. Removal/Installation Float-Actuated Check Valves (see Figure 201)

- A. Equipment Required - None.
- B. Prepare for Replacement of Valve.
 - (1) Defuel corresponding wing tanks; refer to Chapter 12, SERVICING.
 - (2) Inert tank; refer to 28-1-0.
 - (3) Remove access panel nearest valve.

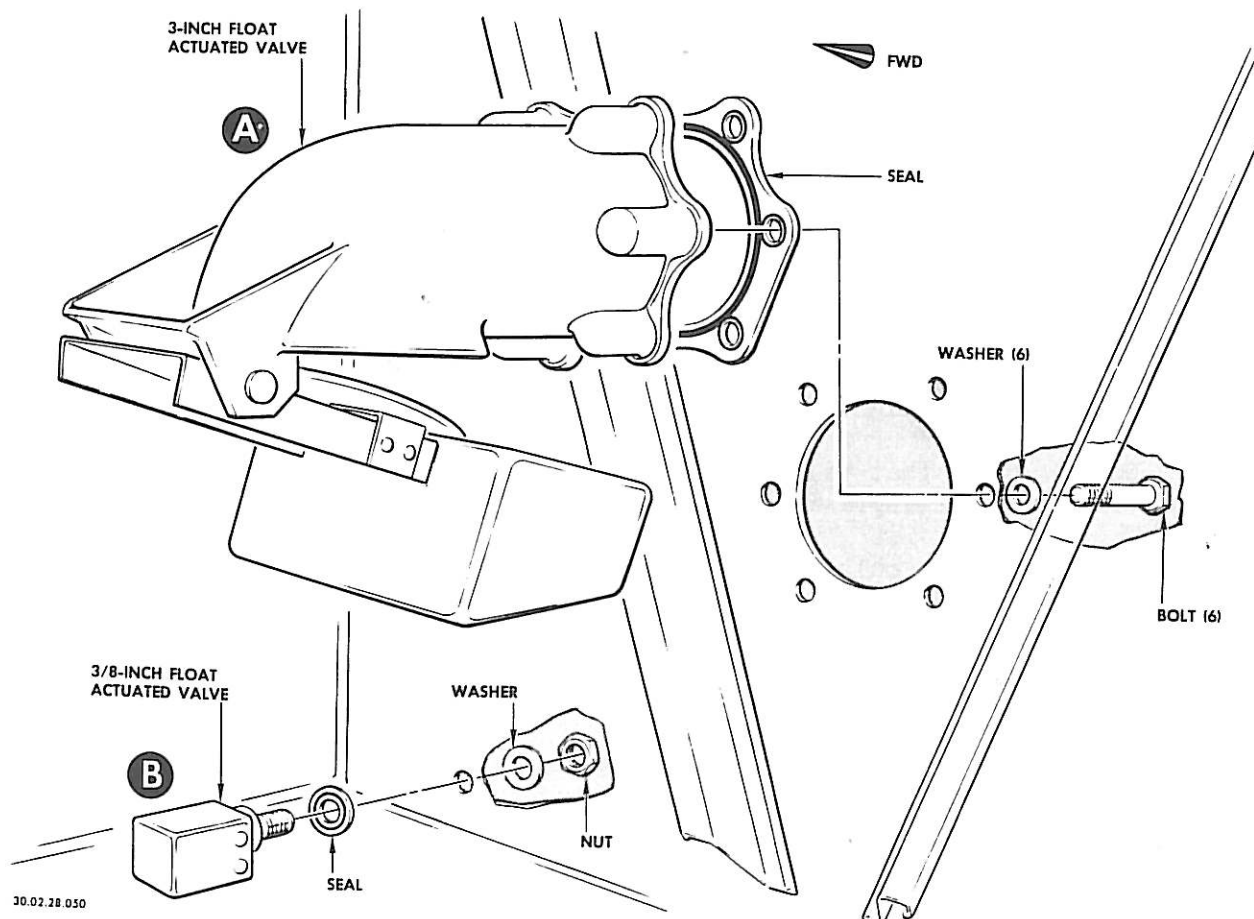
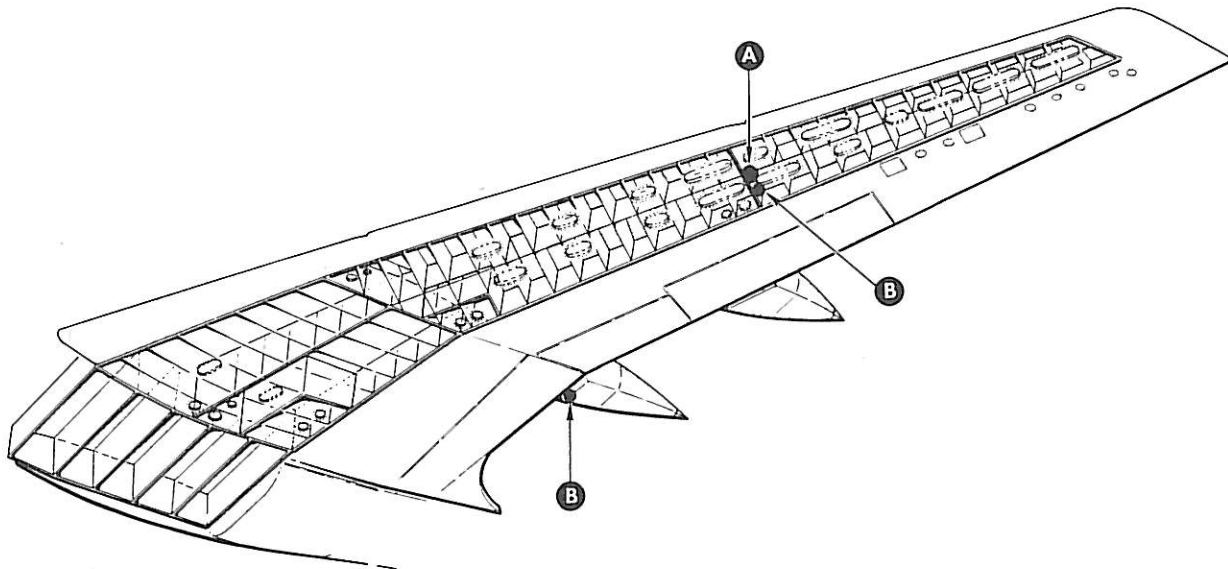
WARNING: OBSERVE TANK ENTRANCE PRECAUTIONS; REFER TO 28-1-0.

- C. Remove Three-Inch Float-Actuated Valve. Remove six attaching bolts and remove valve and seal.
- D. Install Three-Inch Float-Actuated Valve.
 - NOTE: Check that valve float moves freely and seats properly before installing.
 - (1) Clean tank bulkhead and valve mating surfaces and remove non-conducting material from these surfaces.
 - (2) Position the valve and seal at bulkhead with TOP marking on valve up.
 - (3) Install six attachment bolts.
- E. Remove Three-Eighths-Inch Float-Actuated Valve. Hold valve body, remove attaching nut on opposite side of bulkhead, and remove valve.
- F. Install Three-Eighths-Inch Float-Actuated Valve.

NOTE: Check that valve float moves freely and seats properly before installing.

- (1) Clean tank bulkhead and valve mating surfaces and remove non-conducting material from these surfaces.
- (2) Slip seal over valve's threaded shank, then insert shank through bulkhead mounting hole.
- (3) Hold valve with TOP marking up (top surface of valve parallel with lower surface of float on adjacent 3-inch valve) and install attachment nut.

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- (4) Clean fuel tank; refer to 28-1-0.
- (5) Refuel tank; refer to Chapter 12, SERVICING.

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FLAPPER-TYPE CHECK VALVES, TANK WELLS - MAINTENANCE PRACTICES

1. Removal/Installation Flapper-Type Check Valve (see Figure 201)

A. Equipment Required - None.

B. Prepare for Replacement of Valve.

(1) Defuel corresponding wing tank; refer to Chapter 12, SERVICING.

(2) Inert tank; refer to 28-1-0.

(3) Remove access door nearest valve; see Figure 201.

WARNING: OBSERVE TANK ENTRANCE PRECAUTIONS: REFER TO 28-1-0.

C. Remove Flapper-Type Check Valve. Remove two bolts attaching flapper valve to tank structure.

D. Install Flapper-Type Check Valve.

(1) Check valve flapper action.

(2) Remove any non-conducting material on tank structure around flapper valve and attachment bolt holes.

(3) Remove non-conducting material from under bolt heads and bolt mating surfaces on valve.

(4) Attach flapper valve to tank structure with two bolts.

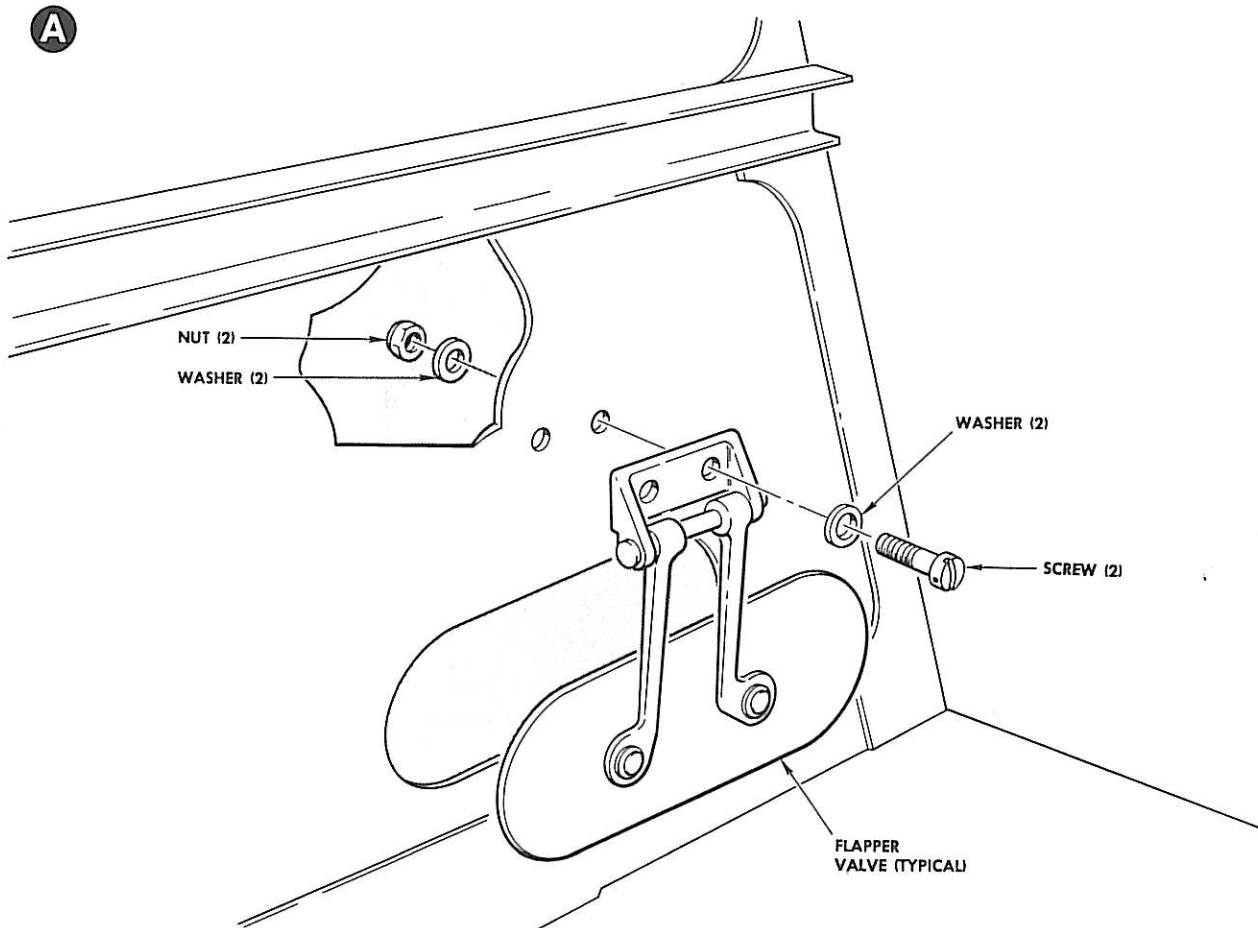
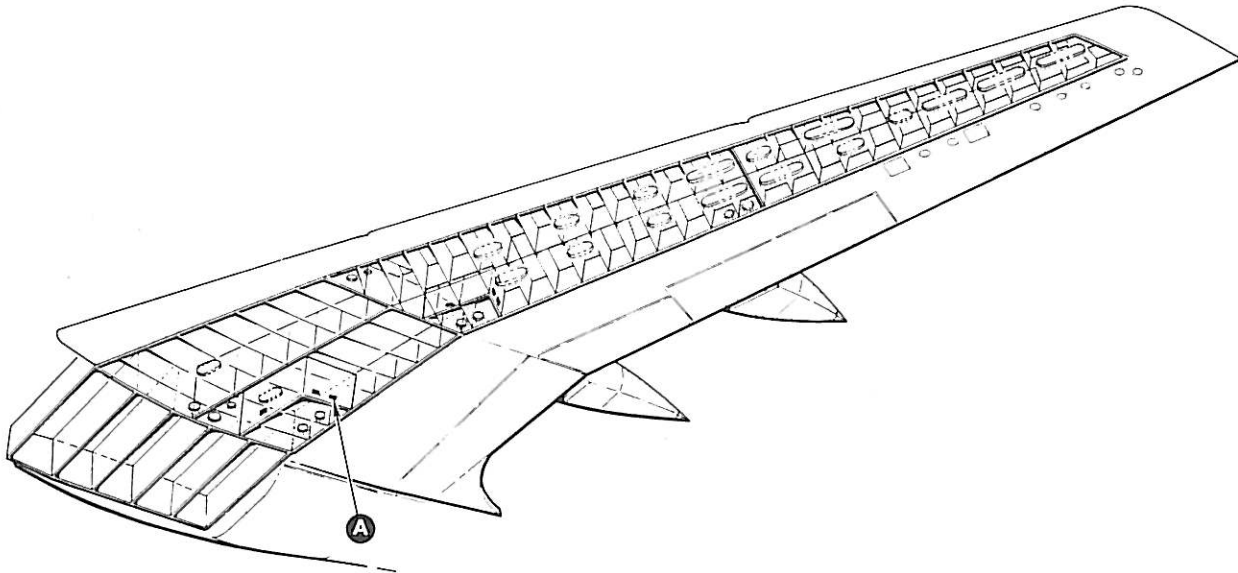
(5) Clean flapper seating surfaces on valve and tank structure.

(6) Check that valve flapper swings freely and seats properly all around opening on tank structure.

(7) Clean fuel tank; refer to 28-1-0.

(8) Refuel tank; refer to Chapter 12, SERVICING.

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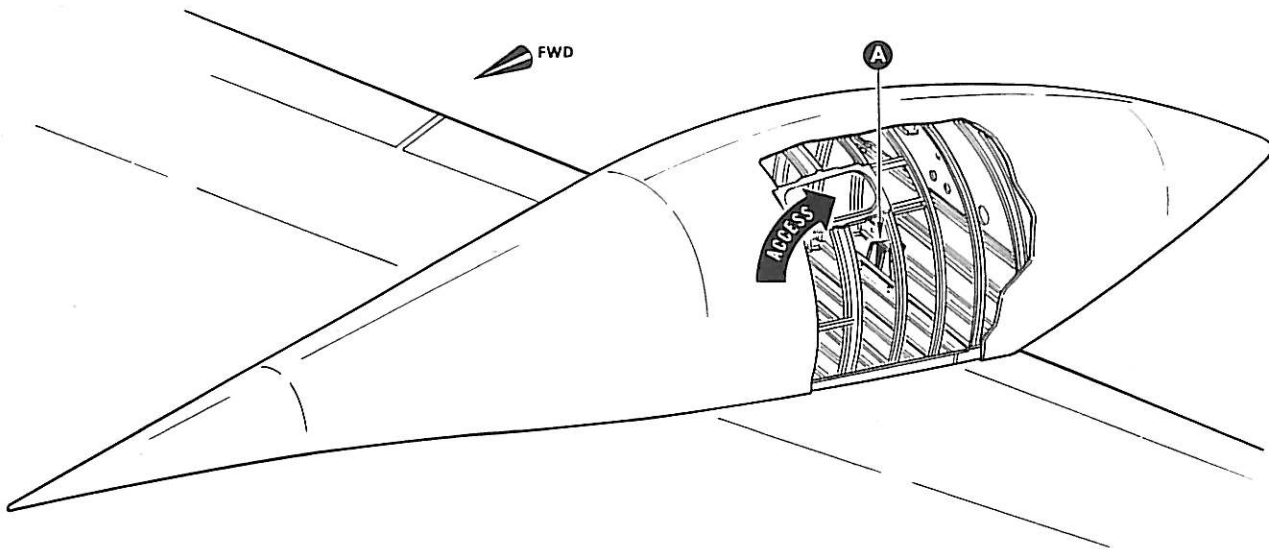
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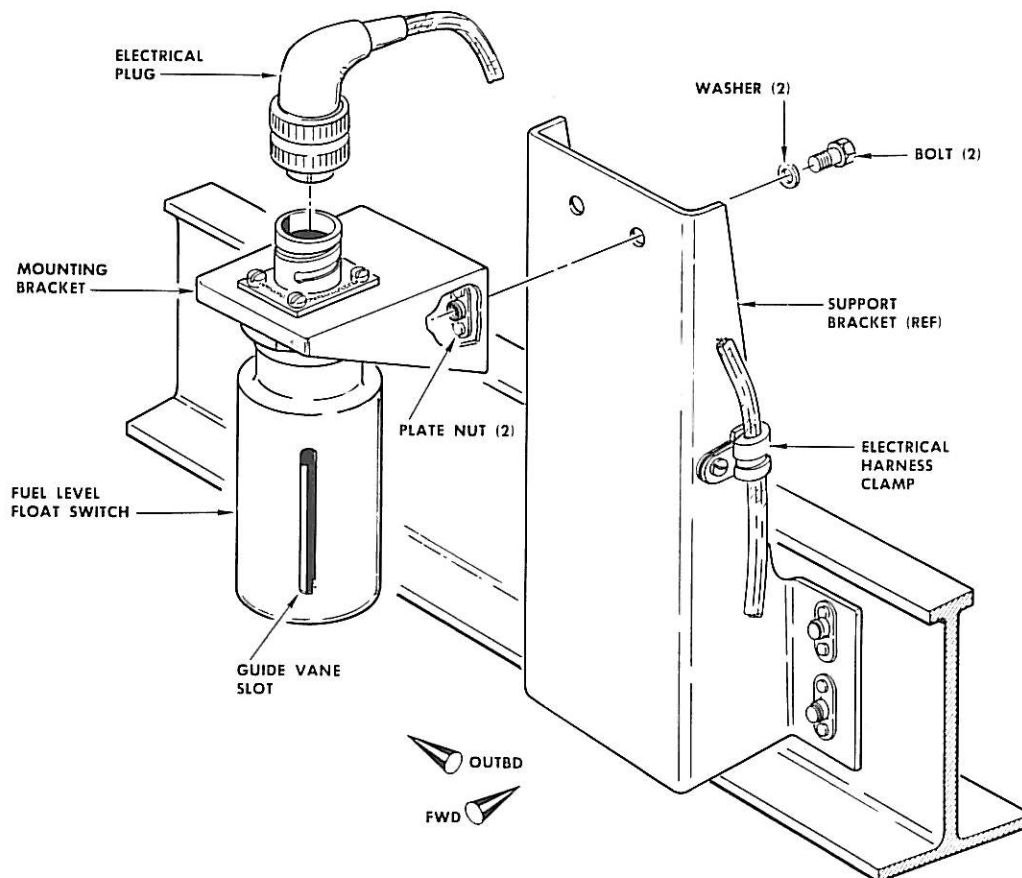
OUTBOARD ANTI-SHOCK BODY FUEL LEVEL FLOAT SWITCH - MAINTENANCE PRACTICES

1. Removal/Installation Outboard Anti-Shock Body (ASB) Fuel Level Float Switch (see Figure 201)
 - A. Equipment Required - None.
 - B. Prepare for Float Switch Replacement.
 - (1) Defuel corresponding outboard anti-shock body; refer to Chapter 12, SERVICING.
 - (2) Inert ASB; refer to 28-1-0.
 - (3) Remove access panel.
 - C. Remove Float Switch.
 - (1) Open and attach warning tag to EXCESS FUEL WARN circuit breaker, on main circuit breaker panel.
 - (2) Disconnect electrical plug from float switch.
 - (3) Remove two bolts attaching float switch to bracket.
 - D. Install Float Switch.
 - (1) Position float switch against bracket and install two attaching screws.
 - (2) Connect electrical plug to float switch.
 - (3) Remove warning tag and close circuit breaker.
 - (4) Clean ASB; refer to 28-1-0.
 - (5) Refuel ASB; refer to Chapter 12, SERVICING.
 - (6) Test switch operation as outlined in Chapter 31, INSTRUMENTS.

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FUEL TANK VENT SYSTEM - DESCRIPTION AND OPERATION1. General

The vent system is associated with refueling, thermal expansion and contraction due to temperature changes, pressure relief during climb, suction relief during dive, and tank pressurization due to ram recovery of the vent scoops.

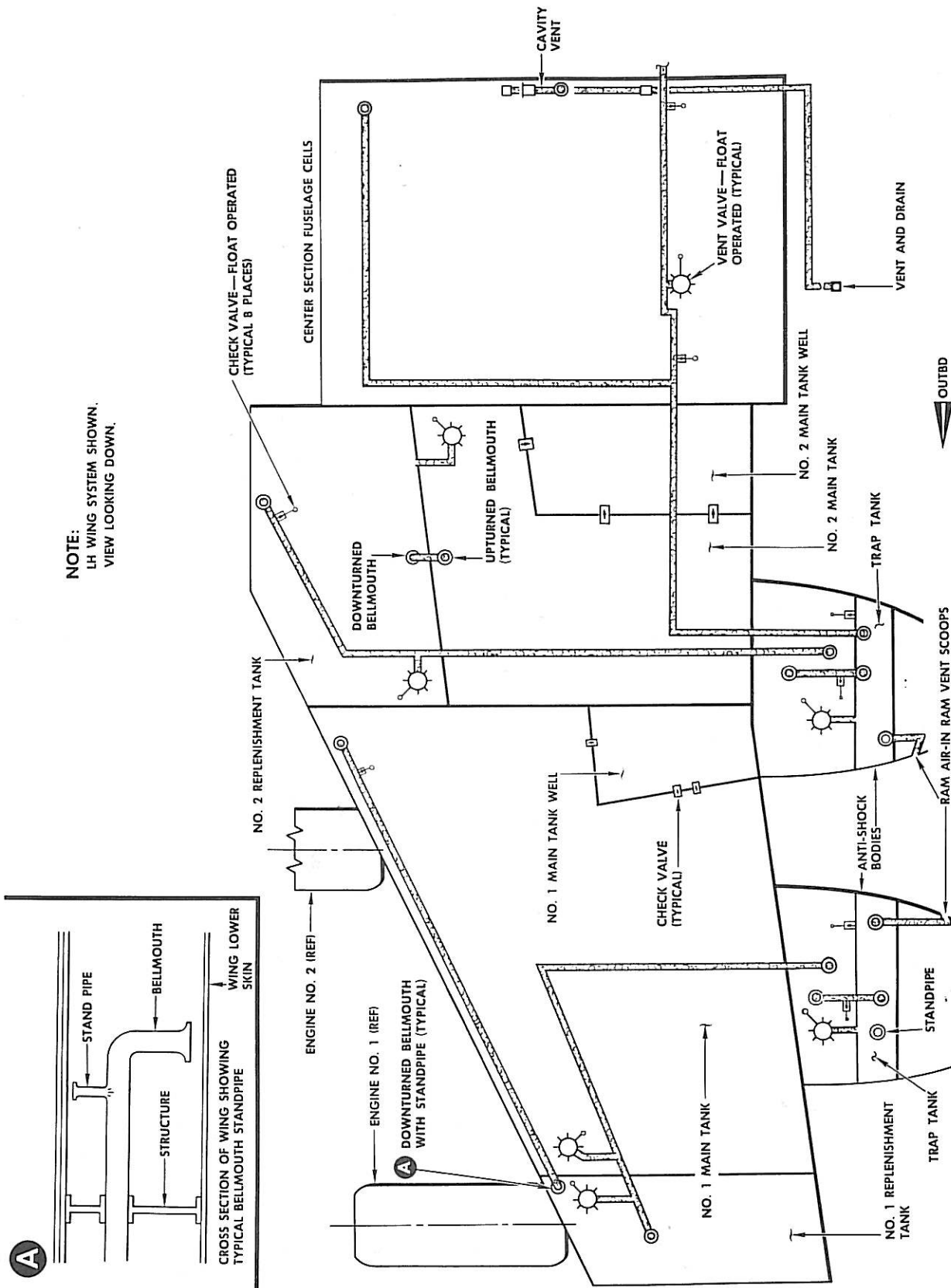
Float-type vent valves are incorporated in each tank vent system. One valve is located in each main tank and in each replenishment tank, and one in each ASB tank. Normally, the float valves are open, to equalize and vent pressure in the tanks. See Figure 1 for a schematic of the fuel tank vent system. The float valve in each inboard main tank connects directly through tubing to its corresponding replenishment tank bulkhead. The float valve in each outboard main tank connects into the vent line between the ASB tank and replenishment tank, and the float valve in each outboard replenishment tank is connected directly to the main vent line routing to the ram vent scoop in the outboard ASB tank. The float valve in each inboard ASB tank vents into the trap compartment.

The float valve in the auxiliary center section tank is connected to the vent line which connects the center section tanks to both inboard ASB trap compartments. The vent system is always open to the trap compartment of one of the ASB tanks. The trap compartment is open to atmosphere through a ram-vent scoop; in flight the scoop maintains a positive pressure in the fuel tanks via the vent system. The trap compartment in the aft section of the ASB's provides ample volume to trap fuel that might be splashed into the vent line during attitude changes. A float-actuated valve will open when the ASB tanks are empty, allowing liquid in the trap compartment to drain into the ASB tank. A differential pressure is maintained while descending from 40,000 feet at maximum rate of descent with tanks 20 percent full, or when in maximum climb with fuel temperature of 54.4 degrees C (130 degree F).

Each wing tank system incorporates intertank vent tubing with a bellmouth at each end. The bellmouth in the main tank points upward; the bellmouth in the replenishment tank points downward. A standpipe is spliced into the elbow of each line on the replenishment tank side and has its bellmouth pointing upward. These vent lines are multipurpose in that they route fuel from the main tanks to the replenishment tanks during pressure refueling, and route fuel from the replenishment tanks to the main tanks during gravity-flow refueling; the bellmouth fittings at each end of the vent lines serve as inlets and outlets for fuel transfer from one tank to another during refueling. The standpipes in the replenishment tanks serve to connect the air spaces of the two tanks.

2. Ram-Vent Scoops

A ram-vent scoop, fitted flush with the aft surface of each ASB, serves two purposes. The primary purpose is to vent vapor pressure from the tanks; the secondary purpose is to introduce ram air pressure into the



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Fuel Tank Vent System Schematic
Figure 1

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tanks. The ram-vent scoop air inductance slot scoops air during flight to the extent that approximately two psi air pressure is maintained in the tank systems. The scoop, which connects to the trap compartment, is located on the inboard side of the outboard ASB's and on the outboard side of the inboard ASB's. Under even the worst icing conditions, the scoops will ice up more slowly than will the wing leading edges; therefore, as long as the airplane is operable, the scoops will still be open.

A single tube connects to the trap compartment to route vapor out of the tanks and to route the pressurized air into the tanks, depending upon ground or flight conditions.

3. Center Section Cavity Vent

A bellmouth and tube assembly in the center section cavity is connected to a flush fitting on the right wing lower surface. This assembly equalizes pressure in the cavity during ascent and descent, to relieve differential pressure.

4. Float Valves

The float valves in the vent system close off vent lines to the anti-shock bodies if the fuel level reaches the float chambers. With high fuel levels, there are attitudes of flight during which fuel may immerse the vent intakes. When this occurs, the floats are buoyed up by the fuel and close their associated valves. During sustained flight attitudes other than straight and level (long distance climb or descent, etc.), tank pressures may change so that internal pressure is greater than ambient pressure. For this reason, there is a double valve assembly in each float valve. One of the two valves has a comparatively great area for volume venting; contained within its body is a smaller valve. When internal pressure against the surface of the larger valve prevents its opening after the float is no longer buoyed by fuel, the smaller valve, presenting comparatively little surface area to the internal pressure, can be actuated open by the float. Pressure then relieved through the smaller valve and the larger valve, which is also linked to the float, is free to be opened. See 28-4-1, Figure 201, for view of typical float actuated vent valve.

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FUEL TANK VENT SYSTEM - TROUBLE SHOOTING

<u>POSSIBLE CAUSE</u>	<u>ISOLATION PROCEDURE AND CORRECTION</u>
1. <u>FUEL DISCHARGES FROM RAM-VENT SCOOP OF LOW ANTI-SHOCK BODY WHEN AIRPLANE IS TURNING</u>	
A. Sticking or defective float valve(s) on affected side.	Enter tanks on affected side. Manually operate valve float and visually check valves to determine which are defective. Replace defective valves.
	<u>WARNING:</u> OBSERVE ALL SAFETY PRECAUTIONS WHEN WORKING IN TANK AREA; REFER TO 28-1-0.
B. Line leaking around Wiggins flex coupling.	Retorque coupling and pressure test line. If leak persists, disassemble coupling and replace O-rings.
C. Pressure relief valve cracking at low pressure due to spring or rubber deterioration.	Replace valve.

FLOAT VALVES - MAINTENANCE PRACTICES1. Removal/Installation Float Actuated Vent Valve (see Figure 201)

A. Equipment Required - None.

B. Prepare for Replacement of Valve.

(1) Defuel corresponding tank; refer to Chapter 12, SERVICING.

(2) Inert tank; refer to 28-1-0.

(3) Remove access panel nearest float valve.

WARNING: OBSERVE TANK ENTRANCE PRECAUTIONS; REFER TO 28-1-0.

C. Remove Float Actuated Vent Valve.

(1) Disconnect tube from valve by disconnecting Wiggins flex coupling; refer to 28-0 for disconnecting typical Wiggins coupling.

(2) Remove four bolts attaching valve to mounting brackets and remove valve.

D. Install Float Actuated Vent Valve.

(1) Position valve in mounting brackets.

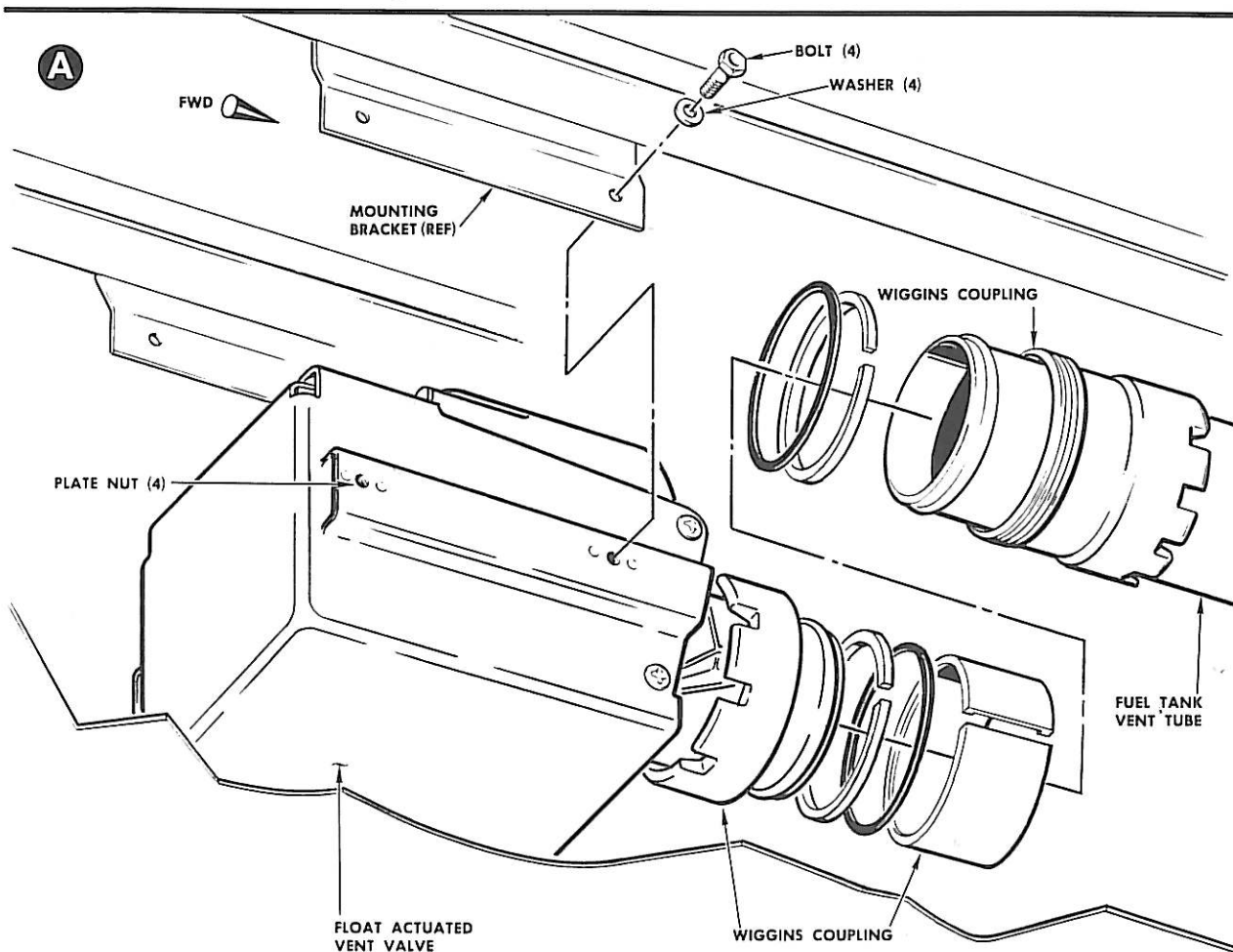
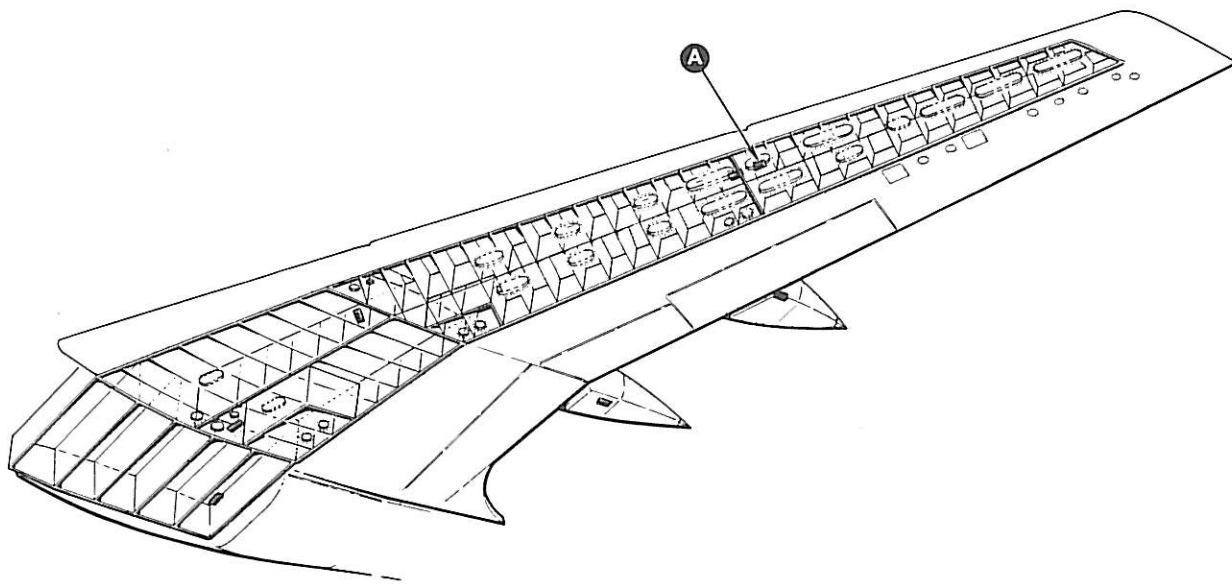
(2) Install four attachment bolts.

NOTE: Before installing bolts, remove non-conducting materials from underside of bolt heads, washers, and mating surfaces.(3) Connect tube to valve; refer to 28-0 for assembling typical Wiggins flex coupling. Make sure that tube ends at flex coupling align within 1 degree, and are separated by 0.12 (± 0.06) inch prior to connecting coupling.

(4) Manually operate valve to make sure that valve seats properly.

(5) Clean fuel tank; refer to 28-1-0.

(6) Refuel tank; refer to Chapter 12, SERVICING.



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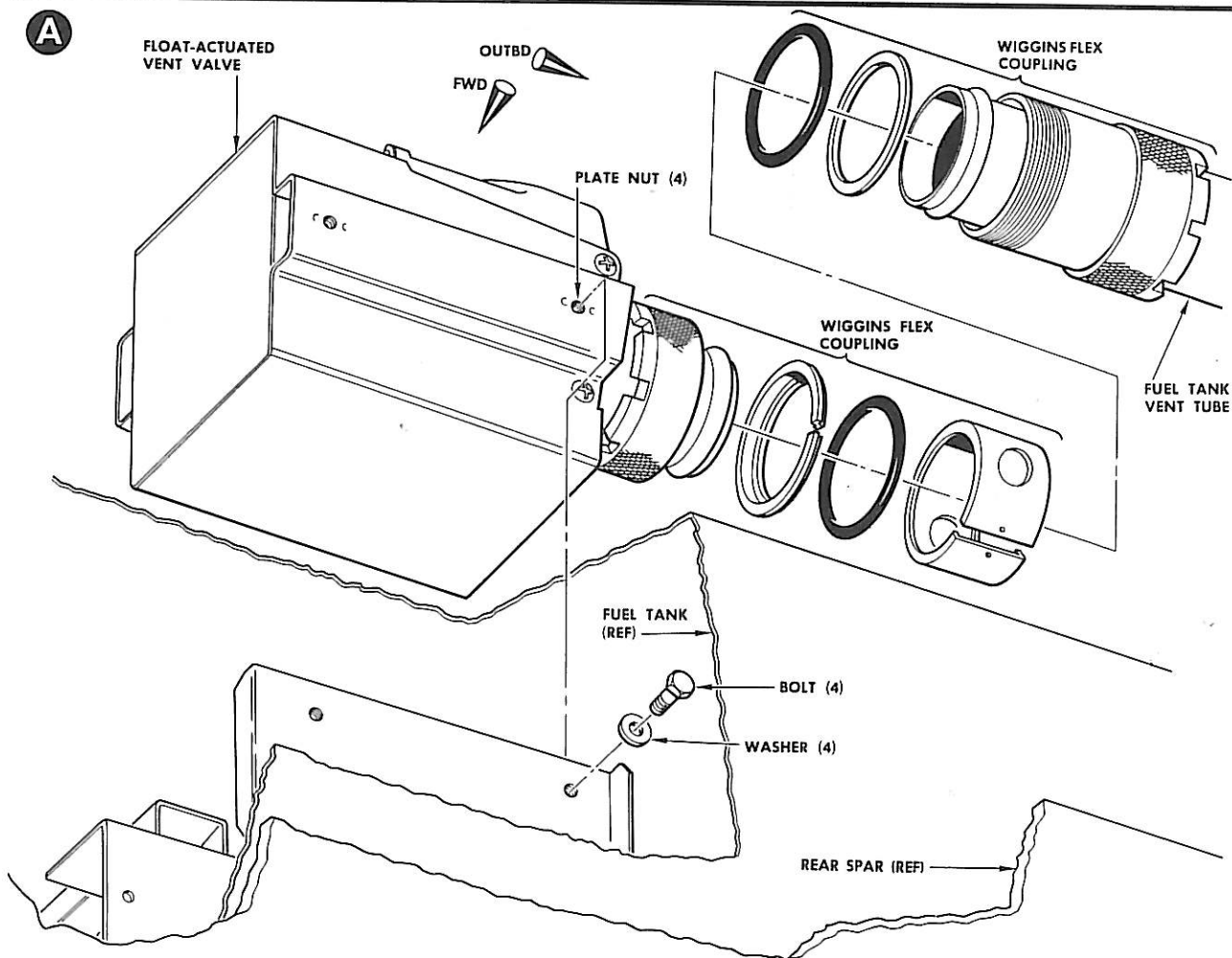
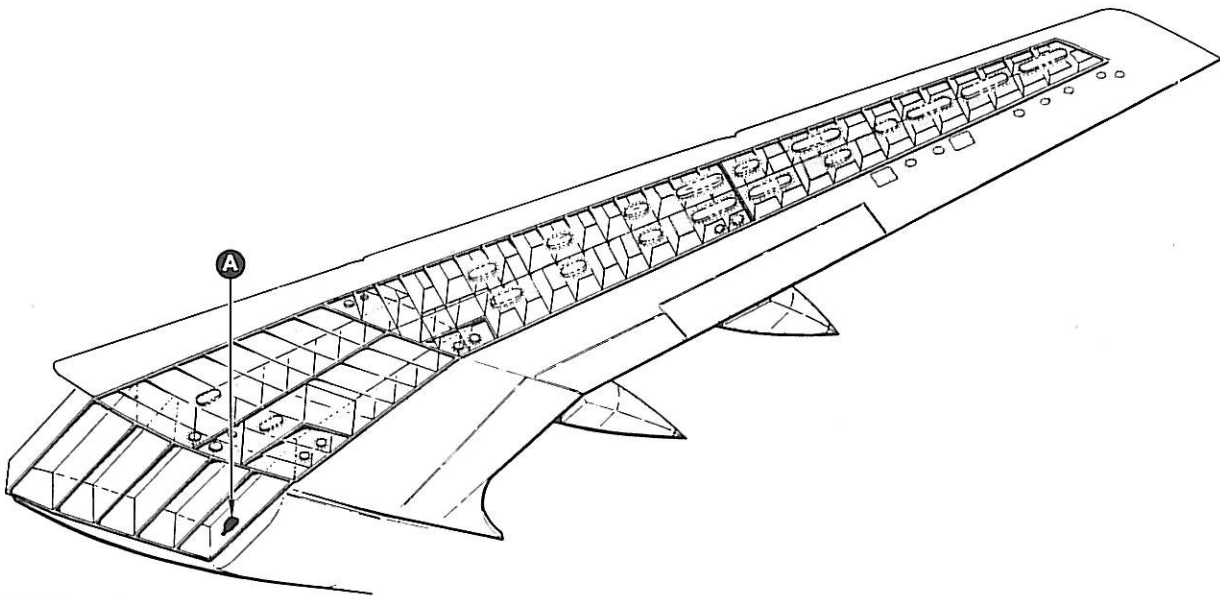
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CENTER TANK FLOAT VALVES - MAINTENANCE PRACTICES

1. Removal/Installation Center Tank Float Actuated Vent Valve (see Figure 201)
 - A. Equipment Required - None.
 - B. Prepare for Replacement of Valve.
 - (1) Defuel center tank; refer to Chapter 12, SERVICING.
 - (2) Inert tank; refer to 28-1-0.

WARNING: OBSERVE TANK ENTRANCE PRECAUTIONS; REFER TO 28-1-0.
 - C. Remove Float Actuated Vent Valve.
 - (1) Disconnect bonding jumper from valve.
 - (2) Disconnect Wiggins flex coupling connecting tube to valve; refer to 28-0 for Wiggins flex coupling procedures.
 - (3) Remove four bolts attaching valve to mounting brackets and remove valve.
 - D. Install Float Actuated Vent Valve.
 - (1) Position valve between mounting brackets and install four attaching bolts.

NOTE: Before installing bolts, remove nonconductive materials from underside of bolt heads, washers, and mating surfaces.
 - (2) Connect tube to valve with Wiggins flex coupling; refer to 28-0 for Wiggins coupling procedure.
 - (3) Connect bonding jumper to valve.
 - (4) Manually operate valve to make sure that valve seats properly.
 - (5) Clean fuel tank; refer to 28-1-0.
 - (6) Refuel tank; refer to Chapter 12, SERVICING.



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FUEL JETTISON SYSTEM - DESCRIPTION AND OPERATION

1. General

The fuel jettison (dumping) system is comprised of components designed for jettisoning and for scavenge jettisoning. The system permits inflight reduction of the maximum allowable airplane takeoff weight to the maximum allowable landing weight. The jettison scavenge portion of the system makes it possible to completely empty the inboard main tanks and the center section tank if an emergency wheels up landing is anticipated. A schematic of the system is shown on Figure 1.

All main tank jettison pumps are controlled by individual guarded switches, correspondingly labeled, on the flight engineer's fuel control panel. The boost-jettison pumps controlled by unguarded switches, scavenge fuel from the center section tank when jettison valves are opened to divert the fuel from the engines to the jettison nozzles. The jettison scavenge pumps, one in each inboard tank system main tank well, are controlled by individual guarded switches that are normally safety wired in the CLOSE position. These switches are also on the flight engineer's fuel control panel. When the switches are actuated to the OPEN position, electrical power from the 28-volt dc emergency bus energizes circuits to valve control solenoids. The solenoids actuate hydraulic valves which port hydraulic fluid pressure to the corresponding hydraulically operated jettison pump motors. The electrical schematic for the control valves is shown on Figure 2.

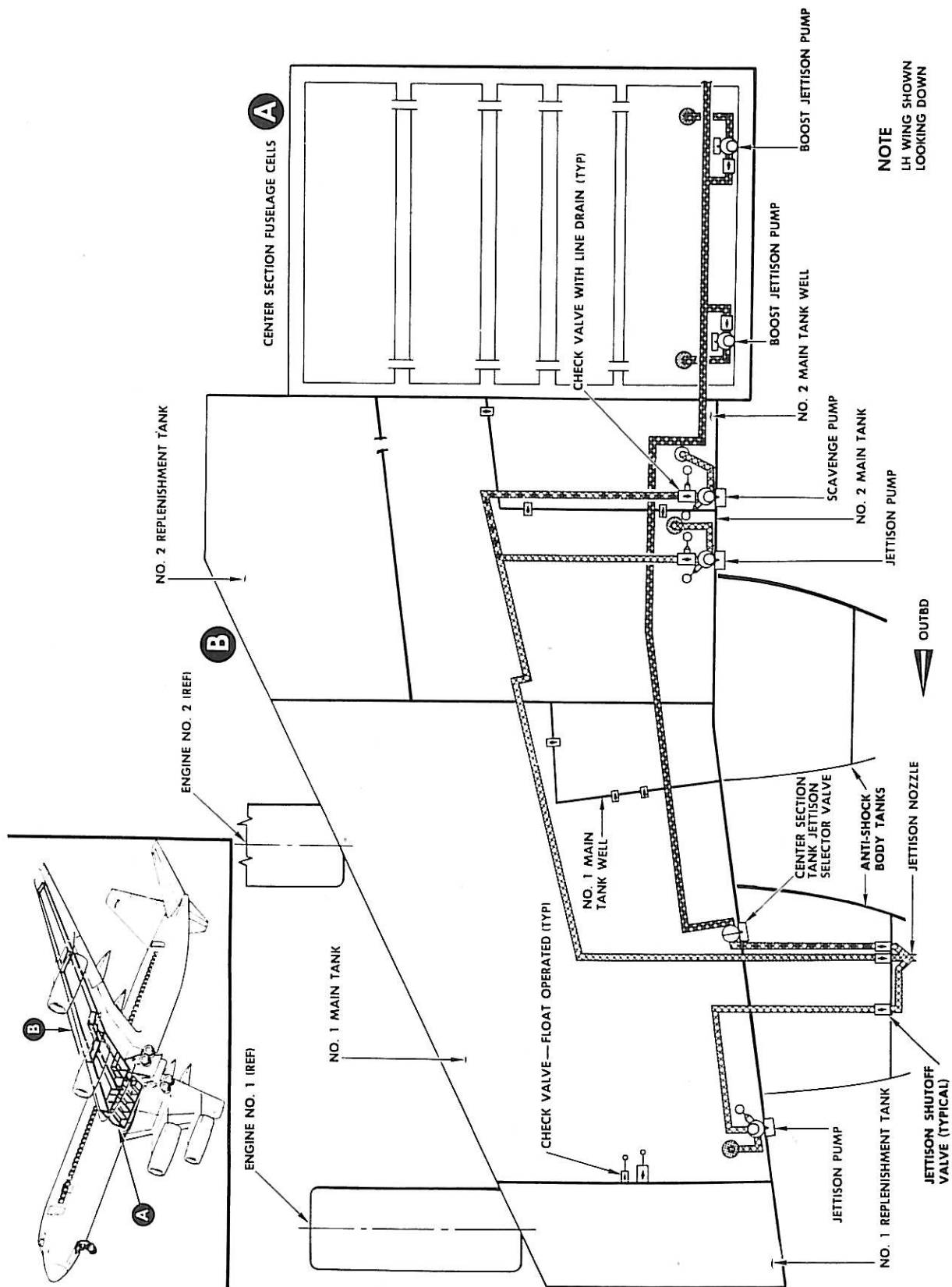
Each outboard fuel tank jettison system is equipped with upturned inlet bellmouth fittings. The inboard fuel tank jettison systems are equipped with downturned inlet bellmouth fittings. Standpipes are located such that with the airplane wing chord plane at +4 degrees, the unjettisonable fuel volumes are 735 US gallons in each outboard main tank and 350 US gallons in each inboard main tank. Approximately 100 gallons of fuel remains in each outboard replenishment tank; normal transfer pump operation will maintain approximately 100 gallons above the standpipe level in each main tank boost pump well. Approximately 225 gallons remains in each inboard replenishment tank when the standpipe in the inboard main tank first uncovers, and will be jettisoned at a reduced rate if jettison pump operation continues.

The jettison scavenge pumps in the two inboard tank system wells pick up fuel from near the bottom of the wells through downturned bellmouth inlets, and therefore scavenge the entire inboard system of each wing (tanks No. 2 and 3). The boost-jettison pumps in the center section tank pick up fuel from their respective sumps through downturned bellmouth inlets; the pumps then jettison the entire contents of this tank. All bellmouths in the jettison system are equipped with 8-mesh screens.

2. Fuel Jettison Pumps

The impeller-type pumps, shown on Figure 3, are mounted on the rear spar of each wing, with the pump elements inside the tank area. The hydraulically driven motors are outside of the fuel tanks. The pumps are interchangeable

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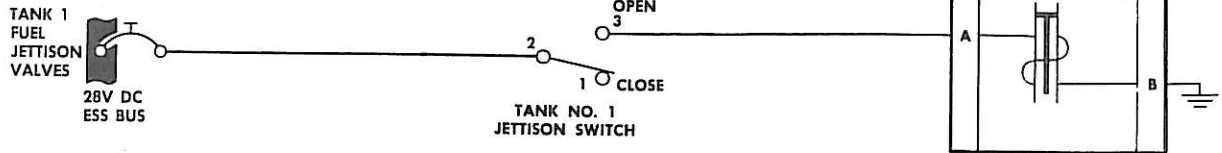


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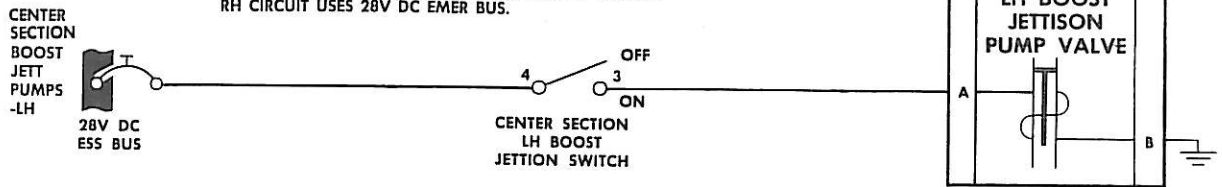
NOTE:

TANK NO. 1 JETTISON CIRCUIT SHOWN.
TANKS NO. 2, 3 AND 4 JETTISON CIRCUITS SIMILAR.
TANKS NO. 2, 3, USE 28V DC EMER BUS.
TANK NO. 4 USES 28V DC ESS BUS.



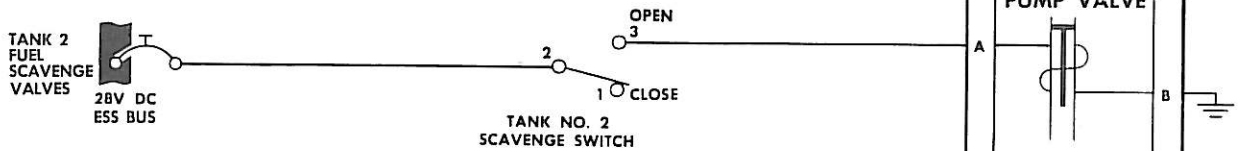
NOTE:

CENTER SECTION BOOST JETTISON LH CIRCUIT SHOWN.
CENTER SECTION BOOST JETTISON RH CIRCUIT SIMILAR.
RH CIRCUIT USES 28V DC EMER BUS.

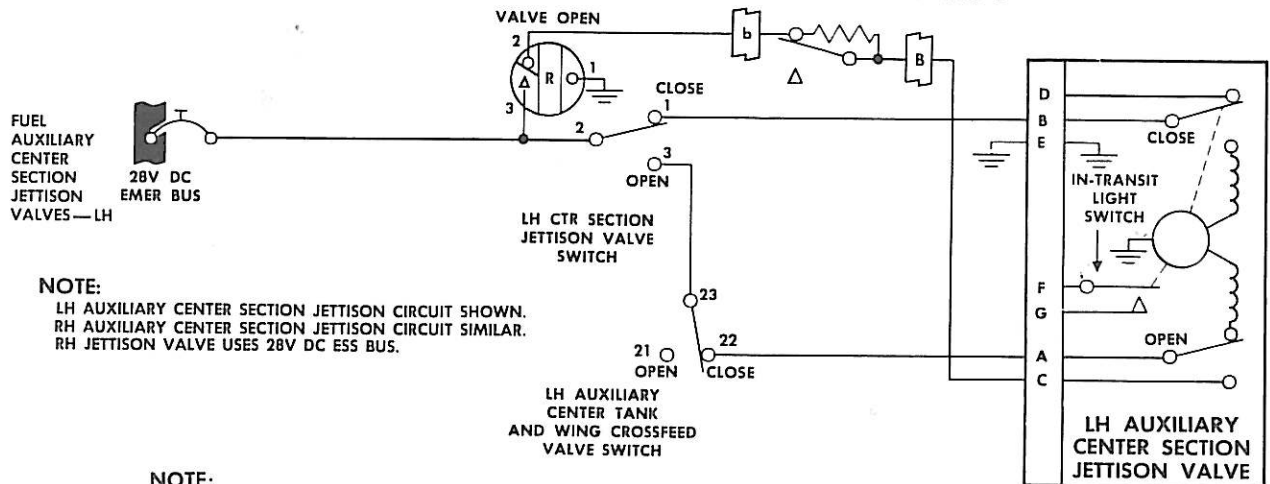


NOTE:

TANK NO. 2 SCAVENGE CIRCUIT SHOWN.
TANK NO. 3 SCAVENGE CIRCUIT SIMILAR.
TANK 3 SCAVENGE USES 28V DC ESS BUS.



MASTER WARN BOX NO. 3



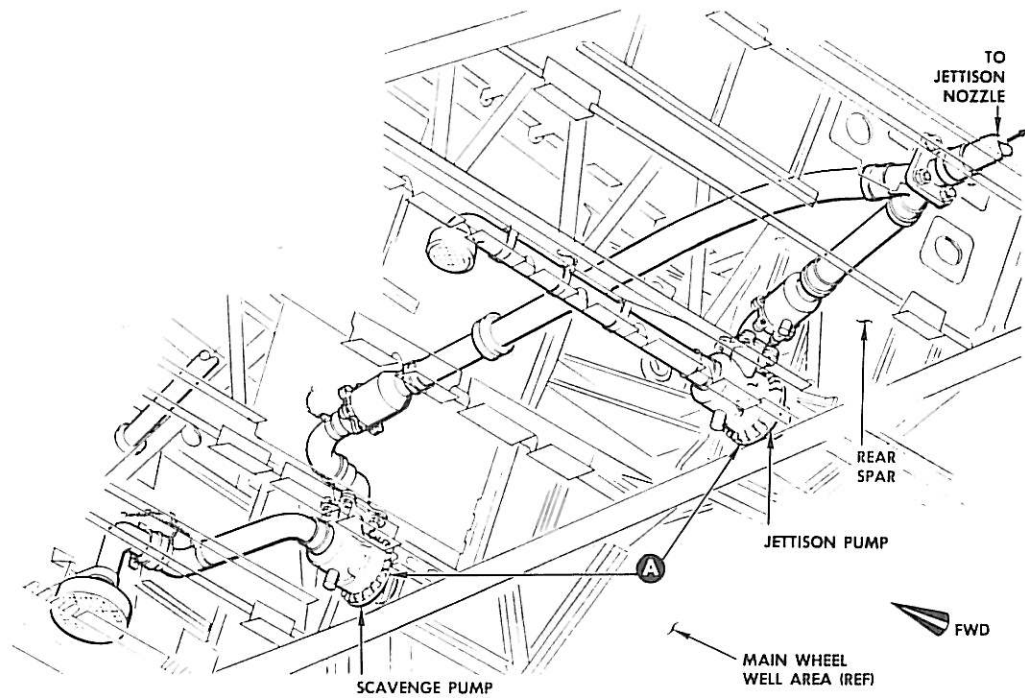
NOTE:

LH AUXILIARY CENTER SECTION JETTISON CIRCUIT SHOWN.
RH AUXILIARY CENTER SECTION JETTISON CIRCUIT SIMILAR.
RH JETTISON VALVE USES 28V DC ESS BUS.

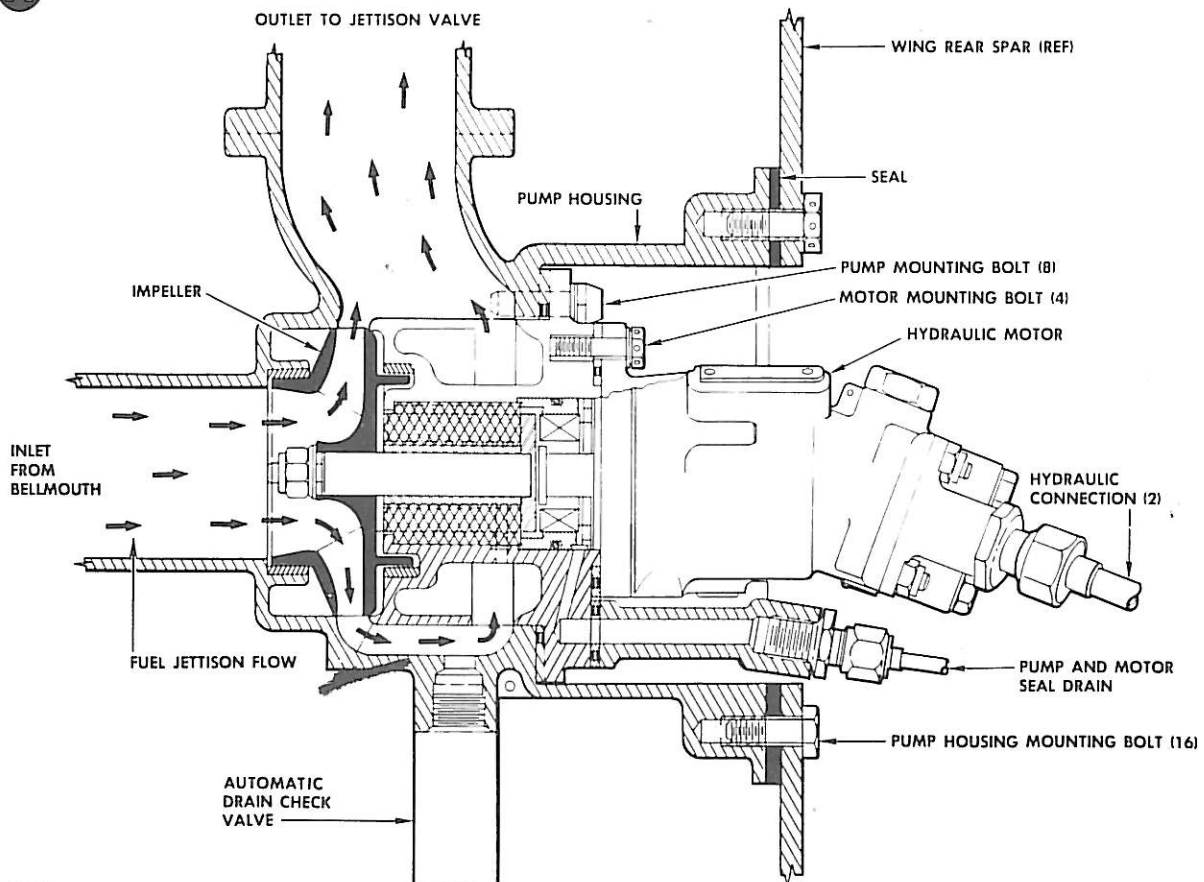
NOTE:

REFER TO WIRING DIAGRAM
MANUAL FOR FUSE AND
CIRCUIT BREAKER AMPERAGES

NO. 2 MAIN TANK



A



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and the drive motors and impeller sections can be removed without draining the tanks. Arrows indicate the direction of hydraulic fluid flow through the motors and fuel flow through the pump, for required pump performance. The pump inlets are protected by 8-mesh screen, with the effective open areas five times the cross-section area of the inlet tubes. During operation of the jettison scavenge pumps, the replenishment tank transfer pumps should be activated to facilitate rapid fuel transfer--the transfer pumps keep the wells full and the scavenge pumps jettison from the wells. Hydraulic power from the No. 1 and No. 2 hydraulic power systems is used for operating the jettison and scavenge pumps. Tanks No. 1 and 4 have a jettison pump, but do not have a scavenge pump. When fuel level is below the pumps, they can be replaced without tank defueling. The pump motors are removed with the fuel at any level.

Two pumps similar to the jettison and scavenge pumps jettison (scavenge) the center section tank fuel. These are boost-jettison pumps, and are not interchangeable with the jettison and scavenge pumps used in the main tank systems. Mounting and operation of the boost-jettison pumps is similar to that of the jettison and scavenge pumps. The boost-jettison pumps have a pressure sensing port for use when being used as boost pumps, and a bolted flange inlet port (the jettison and scavenge pumps have a straight flange inlet). A spring-loaded flapper valve on top of the impeller and pump housing, allows vapor venting. When the pump is removed from the housing, the valve is spring-loaded closed to prevent loss of fuel.

3. Fuel Jettison Nozzles

The jettison nozzles, shown on Figure 4, supply a proper exit stream pattern and establish a minimum exit velocity of fuel in excess of 30 feet per second, to prevent reverse flow of fuel in the wing boundary layer and to retard flame propagation. The permanently fixed jettison nozzles are the triplex type and discharge through the aft tip of each outboard ASB. Each jettison nozzle accommodates the jettison fuel from both main tank systems in its respective wing, and in addition jettisons the center section tank fuel. This arrangement allows a separate flow path from each main wing tank and two separate flow paths from the center section tank.

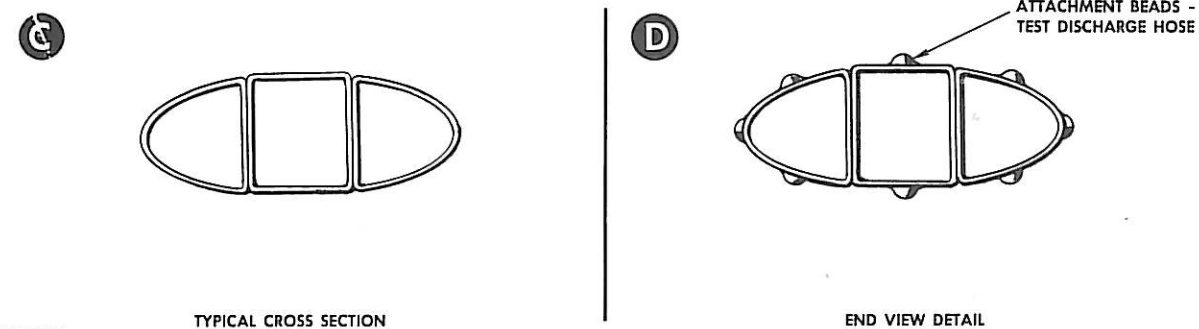
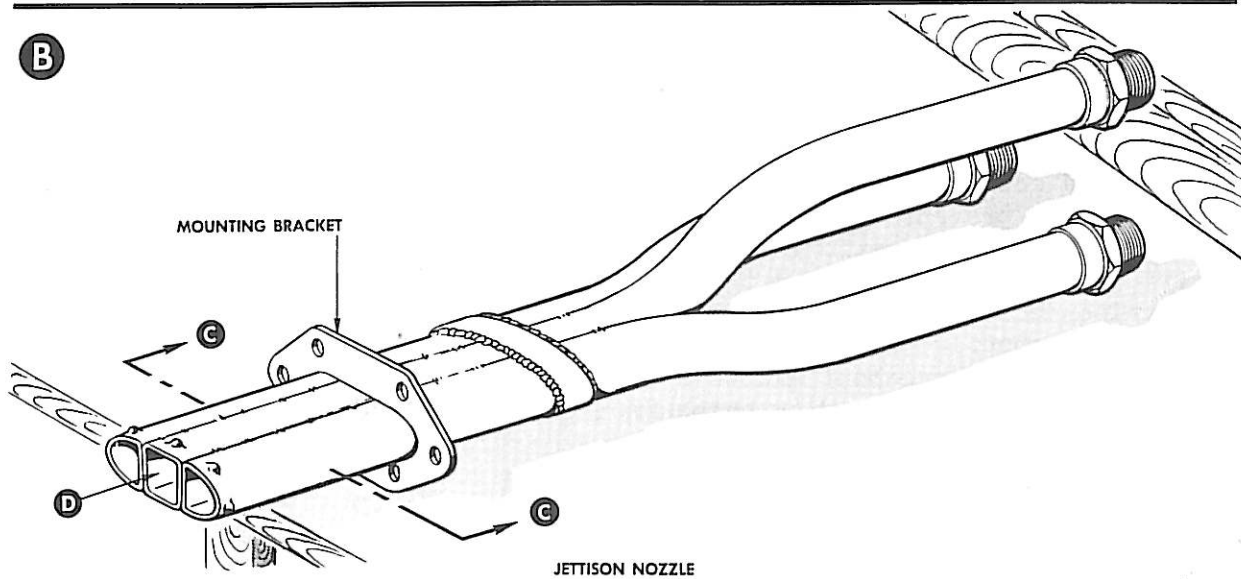
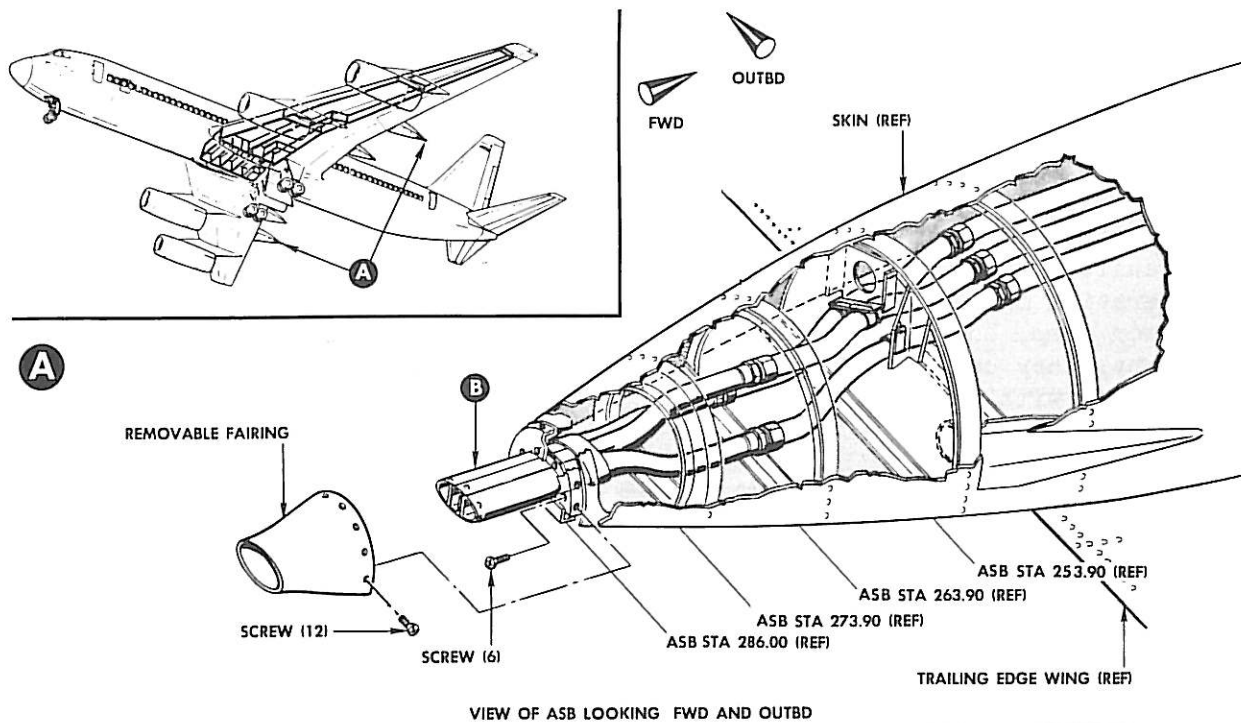
4. Jettison Pump Control Valves

The electrically operated jettison pump control valves control the porting of hydraulic fluid pressure to the jettison, scavenge, and boost-jettison pump drive motors. The valves port hydraulic fluid (pressure and return) from the No. 2 hydraulic power system to operate the jettison system pumps and the right-hand boost-jettison pump, and port hydraulic fluid from the No. 1 hydraulic power system to operate the jettison scavenge system pumps and the left-hand boost-jettison pump. The switches for control of these valves are located on the flight engineer's fuel control panel.

5. Jettison Fuel Shutoff Valves

A mechanical, automatically operated fuel shutoff valve is incorporated in each jettison system line, in close proximity to the jettison nozzle; see

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Figure 5. These shutoff valves--normally retained in the closed position by spring force--are opened automatically by jettison line fuel pressure when the pumps are started. Their primary purpose is to prevent overboard syphoning of fuel, and to serve as flame arrestors. They also prevent fuel spillage due to a fuel head when the airplane is in certain nose up flight attitudes.

6. Center Section Tank Jettison Selector Valves

One center section tank jettison selector valve is installed on each wing rear spar, inboard of each outboard ASB. The individual valve control switches are located in the lower portion of the flight engineer's fuel control panel, with VALVE OPEN light adjacent to each switch. A VALVE OPEN light illuminates any time its corresponding valve is not completely closed. When the jettison selector valves are opened for jettisoning, the crossfeed and/or the aux ctr tank and wing crossfeed valves must be closed.

7. Jettison Pump Check Valves

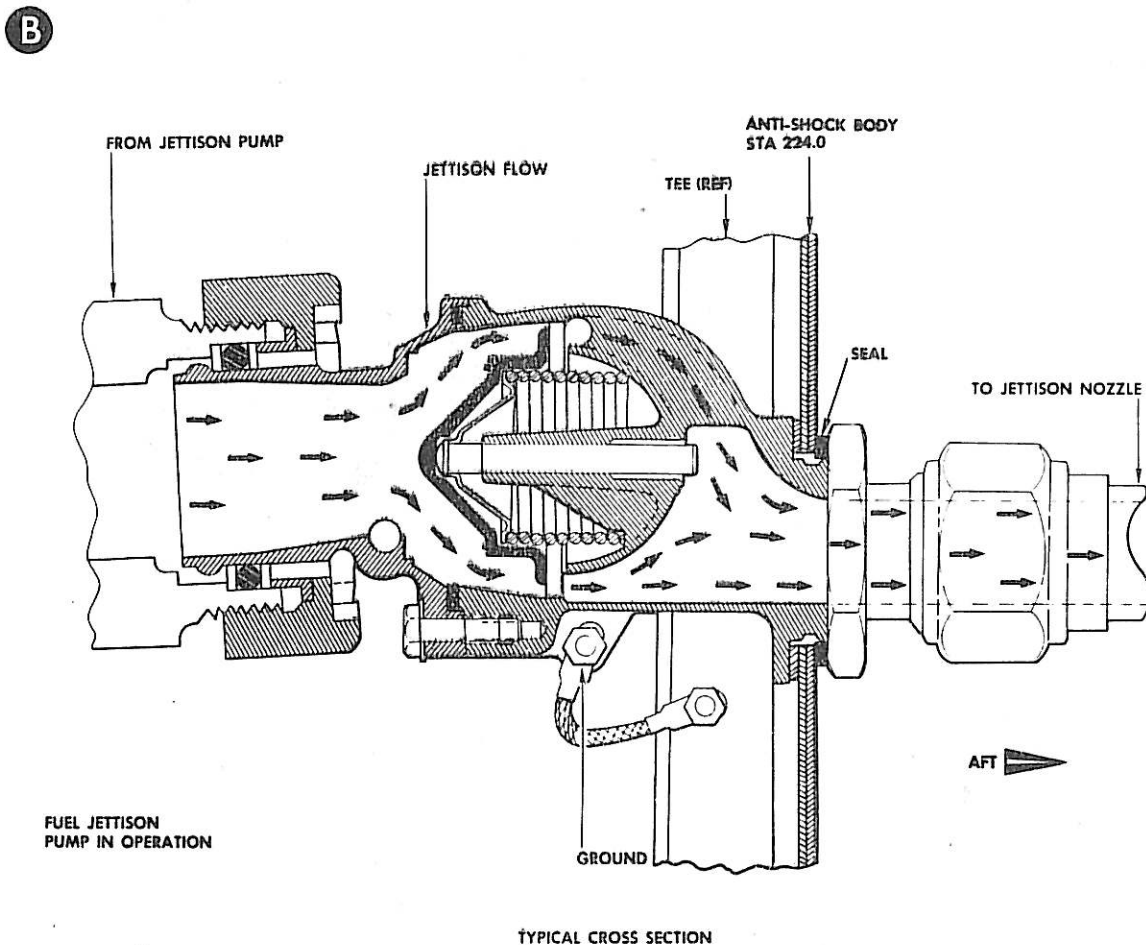
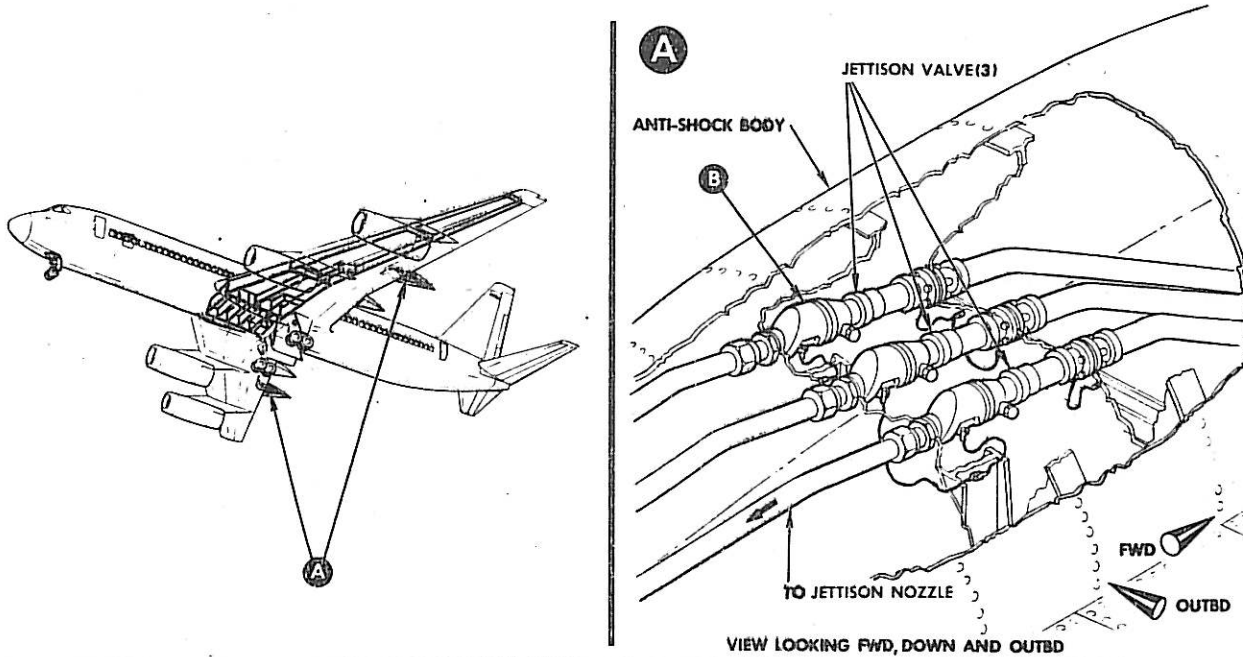
The jettison and scavenge pump in each inboard main tank are connected in parallel. Therefore, a check valve is installed at the discharge side of each pump to prevent backpressure fuel discharge through the pump that is not operating. There is no check valve at the outboard main tank jettison pump discharge.

The boost-jettison pumps, also connected in parallel, each have a check valve on their downstream side to prevent backpressure fuel flow out of the inactive pump when only one pump is operating.

8. Jettison Line Check Drain Valves

Check drain valves at each jettison pump in the wings remain open when the system is not in use. This allows fuel in the jettison lines to drain into the tanks, so that it may be used. When the jettison system is operated, the valves are snapped closed by the pump discharge pressure.

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FUEL JETTISON SYSTEM - TROUBLE SHOOTING

<u>POSSIBLE CAUSE</u>	<u>ISOLATION PROCEDURE AND CORRECTION</u>
1. <u>NO OPERATION - ALL PUMPS</u>	
A. No power in 28-volt dc emergency bus.	Check for presence of power in bus. If no power, refer to Chapter 24, ELECTRICAL POWER for source of trouble.
2. <u>ONE JETTISON PUMP OR ONE SCAVENGE PUMP WILL NOT OPERATE</u>	
A. Defective circuit breaker.	Check for presence of power through circuit breaker. If no power, replace circuit breaker.
B. Defective control switch.	Check for continuity through control switch. If no continuity, replace switch.
C. Defective valve solenoid.	Check for continuity through solenoid. If no continuity, replace solenoid valve.
D. Defective wiring between circuit breaker and switch, or switch and solenoid.	Check for continuity through wiring. If no continuity, repair or replace wiring.
E. Defective control valve.	Replace valve.
3. <u>JETTISON PUMPS AND LEFT BOOST/JETTISON PUMP WILL NOT OPERATE (SCAVENGE PUMPS AND RIGHT BOOST/JETTISON PUMP OPERATE)</u>	
A. No hydraulic pressure from hydraulic system No. 1.	Refer to Chapter 29, HYDRAULIC POWER for source of trouble.
4. <u>SCAVENGE PUMPS AND RIGHT BOOST/JETTISON PUMP WILL NOT OPERATE (JETTISON PUMPS AND LEFT BOOST/JETTISON PUMP OPERATE)</u>	
A. No hydraulic pressure from hydraulic system No. 2.	Refer to Chapter 29, HYDRAULIC POWER for source of trouble.
5. <u>FLOW FROM JETTISON NOZZLE RESTRICTED BELOW NORMAL RATE</u>	
A. Low pressure from hydraulic system.	Check hydraulic system pressure. Refer to Chapter 29, HYDRAULIC POWER for source of trouble.

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POSSIBLE CAUSE

ISOLATION PROCEDURE AND CORRECTION

5. FLOW FROM JETTISON NOZZLE RESTRICTED BELOW NORMAL RATE (CONT)

- | | |
|---|---|
| B. Defective jettison shutoff valve. | Test valve; refer to Adjustment/Test. |
| C. Loose joint or broken jettison line in tank. | Check lines for condition. Replace line. |
| D. One or more jettison, boost/jettison, or scavenge pump(s) inoperative. | Isolate inoperative pump by connecting a hose to the jettison nozzle and alternately operating each pump; refer to Fuel Jettison System Functional Test. If a pump is inoperative, refer to items 2., 3., and 4 for possible cause. |

6. SPILLAGE FROM JETTISON NOZZLE DURING FLIGHT

- | | |
|---------------------------------------|---------------------------------------|
| A. Jettison shutoff valve not closed. | Test valve; refer to Adjustment/Test. |
|---------------------------------------|---------------------------------------|

7. ALL FUEL NOT DRAINING FROM JETTISON LINE

- | | |
|--|----------------------------------|
| A. Check all low point drain valves in line and at pump. | Replace drain valve if not open. |
|--|----------------------------------|

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FUEL JETTISON SYSTEM - MAINTENANCE PRACTICES1. Adjustment/Test Fuel Jettison System - Leak Test

A. General.

This leak test should be performed whenever any part of the jettison system has been opened. Procedures for assembling and disassembling typical Wiggins flexible couplings are outlined in 28-0.

B. Equipment Required.

- (1) Expandable hose connection to fit over end of jettison nozzle.
(Hose to be capped or plugged at one end.)
- (2) Strap clamp to hold hose in place.
- (3) Expandable rubber plugs to fit 2.00 inch jettison pump inlet. Plug to have fitting to connect to source of air pressure.
- (4) Source of 60.0 psi dry filtered air, incorporating a gage capable of indicating pressures up to 60.0 psi.
- (5) Leak detector type H-1 (General Electric Co.).
- (6) Freon 12 gas supply.
- (7) Bubble fluid, Specification MIL-L-25567.

C. Prepare for Leak Test.

- (1) Defuel wing tanks for side of airplane to be tested; refer to Chapter 12, SERVICING.
- (2) Inert tanks; refer to 28-1-0.
- (3) Remove access panels to tanks containing jettison piping being tested; refer to 28-5-0, Figure 1 for piping schematic.

WARNING: OBSERVE TANK ENTRANCE PRECAUTIONS: REFER TO 28-1-0.

- (4) Remove drain line from applicable jettison pump housing and plug opening in pump housing.
- (5) Plug pump shaft seal drain.
- (6) Remove clamp attaching jettison pump inlet bellmouth and remove bellmouth.

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(7) Install expandable rubber plug in 2.00 inch inlet tube from which bellmouth was removed.

(8) Connect source of air pressure to fitting on plug.

D. Perform Functional Check of Jettison Shutoff Valve.

(1) Slowly turn on source of air pressure. Shutoff valve shall crack open at 7.5 psi minimum and shall be fully open at 12.0 psi. This is determined by feeling airflow from end of nozzle outlet.

(2) Slowly reduce air pressure. Valve shall close at 7.0 psi minimum.

E. Perform Leak Test of No. 1 (or No. 4) Tank Jettison Line.

(1) Place expandable hose over jettison nozzle outlet and clamp in place.

(2) Inject a small amount of Freon 12 gas into 2.00 inch line.

(3) Pressurize jettison line to 10.0 psi air pressure.

(4) Check all fittings for leaks. (Use leak detector on medium scale.)

NOTE: Bubble fluid may be used as an alternate in leak testing. Remove bubble fluid after test by rinsing surfaces with fresh clean tap water, and dry with clean rags or filtered shop air.

(5) If any leakage exists, mark leaking points, reduce pressure in line to zero, and repair leaks.

(6) Repeat steps (4) and (5) until check shows system is free of leaks.

(7) Repressurize jettison line to 60.0 psi and again test for leaks. Repeat procedure until system is leakproof.

(8) Reduce pressure to zero and remove all test equipment.

(9) Clamp bellmouth in place at jettison pump inlet connection.

(10) Install jettison pump housing drain line.

(11) Clean fuel tanks; refer to 28-1-0.

(12) Refuel tanks; refer to Chapter 12, SERVICING.

F. Perform Leak Test of No. 2 (or No. 3) Tank Jettison Lines. The procedure for leak testing the No. 2 or No. 3 tank jettison lines is the same as for No. 1 or No. 4 tank, except that both jettison pump inlet tubes should be pressurized at the same time.

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G. Perform Leak Test of AUX CTR TANK Jettison Lines.

To leak test the center tank and left wing tank piping of the auxiliary center tank jettison system, close the R.H. AUX CTR TANK JETTISON VALVE and left wing AUX CTR TANK AND WING CROSS FEED valve, open the L.H. AUX CTR SEC TANK JETTISON VALVE; proceed with the same method used for testing No. 1 and No. 4 tank jettison lines. Leak test the center tank and right wing piping of the auxiliary center tank jettison system the same way except close the L.H. AUX CTR TANK JETTISON VALVE and right wing AUX CTR TANK AND WING CROSS FEED valve, and open the R.H. AUX CTR SEC TANK JETTISON VALVE.

2. Adjustment/Test Fuel Jettison System Functional Test

A. Equipment Required.

- (1) External source of 115/200-volt, 3-phase, 400 cps ac electrical power.
- (2) External source of 3000 psi hydraulic power.
- (3) Defuel truck with adapter hose for connection to jettison nozzle.

B. Prepare for Functional Test.

NOTE: Airplane shall be fully fueled to perform this test. Refer to Chapter 12, SERVICING, for fueling procedure.

- (1) Attach defueling nozzle (with adapter) to jettison nozzle on No. 1 ASB.
- (2) Check that JETTISON and SCAVENGE switches on flight engineer's fuel control panel are in CLOSE position (guard closed).
- (3) Open and attach warning tag to FUEL JETTISON VALVES and FUEL SCAVENGE VALVES circuit breakers, on main circuit breaker panel.
- (4) Connect external source of ac electrical power to airplane. Refer to Chapter 24, ELECTRICAL POWER for procedure.
- (5) Connect external source of hydraulic power to No. 1 and No. 2 EXT QUICK DISC in the hydraulic compartment; refer to Chapter 12, SERVICING.

C. Perform Functional Test of Main Tank Jettison System.

WARNING: DO NOT PERFORM FUNCTIONAL TEST IF WIRING TO A FUEL QUANTITY INDICATOR, OR TO THE TRANSFER SWITCH BOX, IS DISCONNECTED. WHEN WIRING IS DISCONNECTED, THE GROUND CONNECTION FOR THE ASSOCIATED TANK PROBES IS OPEN, AND THE JETTISONING OF FUEL CAN BUILD UP STATIC ELECTRICITY.

- (1) Close FUEL JETTISON VALVES and FUEL SCAVENGE VALVES circuit breakers, on main circuit breaker panel.

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- (2) Close the four FUEL QUANTITY INDICATORS circuit breakers, on main circuit breaker panel.
 - (3) Apply ac power to the pilot's ac essential bus by placing the pilot's ac essential bus selector switch in the EXT PWR position, and the No. 4 T-R control switch in ON position; refer to Chapter 24, ELECTRICAL POWER.
 - (4) Actuate TANK NO. 1 JETTISON switch on the flight engineer's fuel control panel to OPEN. Fuel shall flow from the inboard port of the jettison nozzle on No. 1 ASB within five seconds. Check for positive flow.
 - (5) Actuate TANK NO. 1 JETTISON switch to CLOSE. Fuel flow shall stop.
 - (6) Actuate TANK NO. 2 JETTISON switch to OPEN. Fuel shall flow from center port of the jettison nozzle on No. 1 ASB within 10 seconds. Check for positive flow.
 - (7) Actuate TANK NO. 2 JETTISON switch to CLOSE. Fuel flow shall stop.
 - (8) Repeat steps (6) and (7) except actuate TANK NO. 2 SCAVENGE switch.
- NOTE: TANK NO. 2 SCAVENGE switch is lockwired to the CLOSE position. Replace lockwire when testing is completed.
- (9) Functionally test the right wing jettison system, following the same procedure outlined for the left wing.

D. Perform Functional Test of Center Tank Jettison System.

- (1) Close center tank FUEL AUXILIARY CENTER SECTION JETTISON VALVE and BOOST-JETTISON PUMP circuit breakers on main circuit breaker panel.
- (2) Close AUX CTR TANK and WING CROSS FEED switches on flight engineer's fuel control panel.
- (3) Actuate CTR TANK JETTISON VALVES - LH switch on flight engineer's fuel control panel to OPEN. Associated VALVE OPEN light will illuminate while valve is in transit and remain illuminated when valve is open.
- (4) Actuate BOOST JETTISON PUMP - LH switch on flight engineer's panel to ON. Fuel shall flow from the outboard port of the jettison nozzle on No. 1 ASB in ten seconds. Check for positive flow.
- (5) Actuate BOOST JETTISON PUMP - LH switch to OFF. Fuel flow shall stop. Center tank jettison VALVE OPEN light will remain illuminated while valve is in transit and extinguish when valve is closed.

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- (6) Repeat step (3), except substitute RH for LH.
- (7) Repeat step (4), except substitute RH for LH. Fuel shall flow from the outboard port of the jettison nozzle on No. 4 ASB in ten seconds. Check for positive flow.
- (8) Actuate BOOST JETTISON PUMP - RH switch to OFF. Fuel flow shall stop.

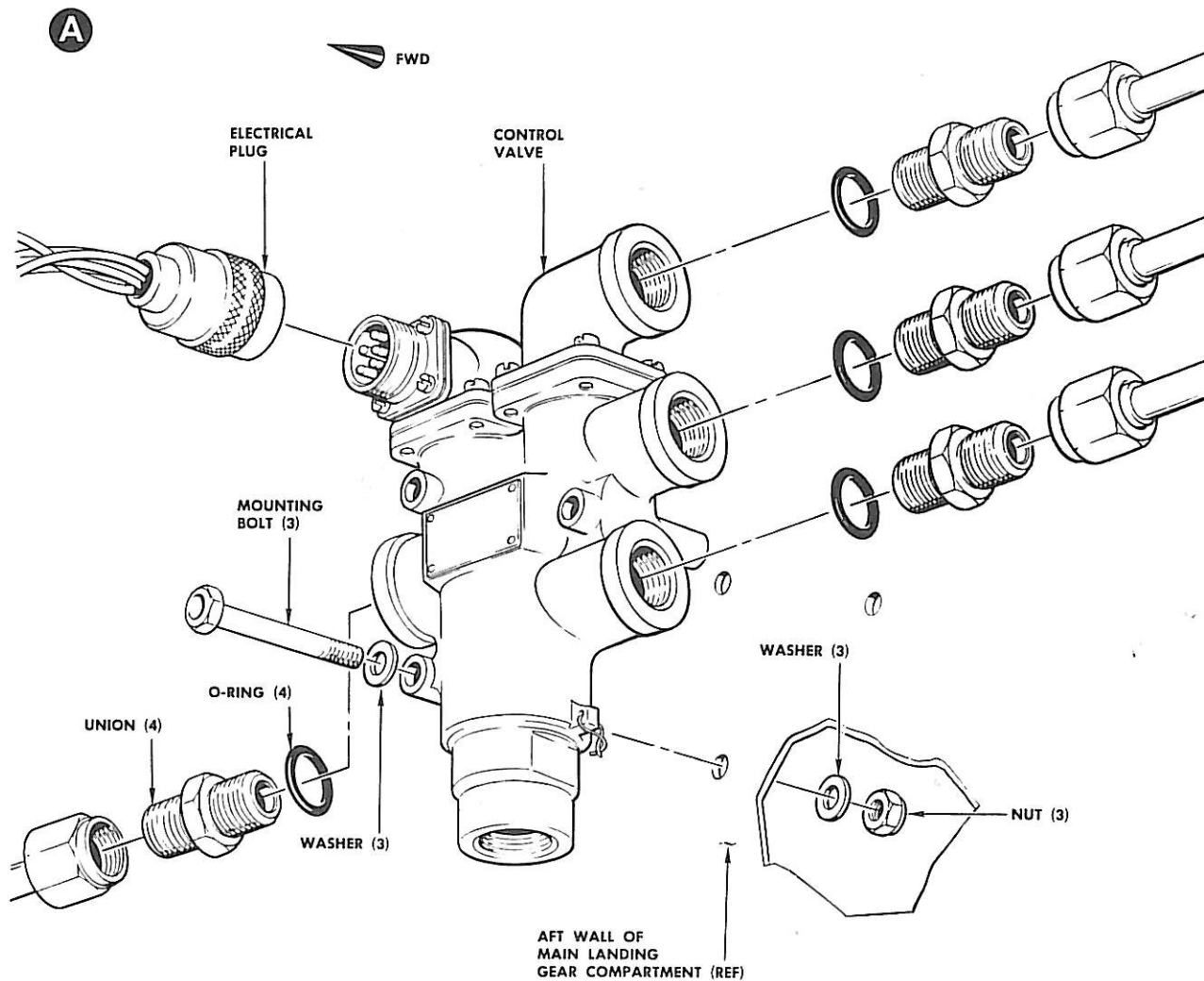
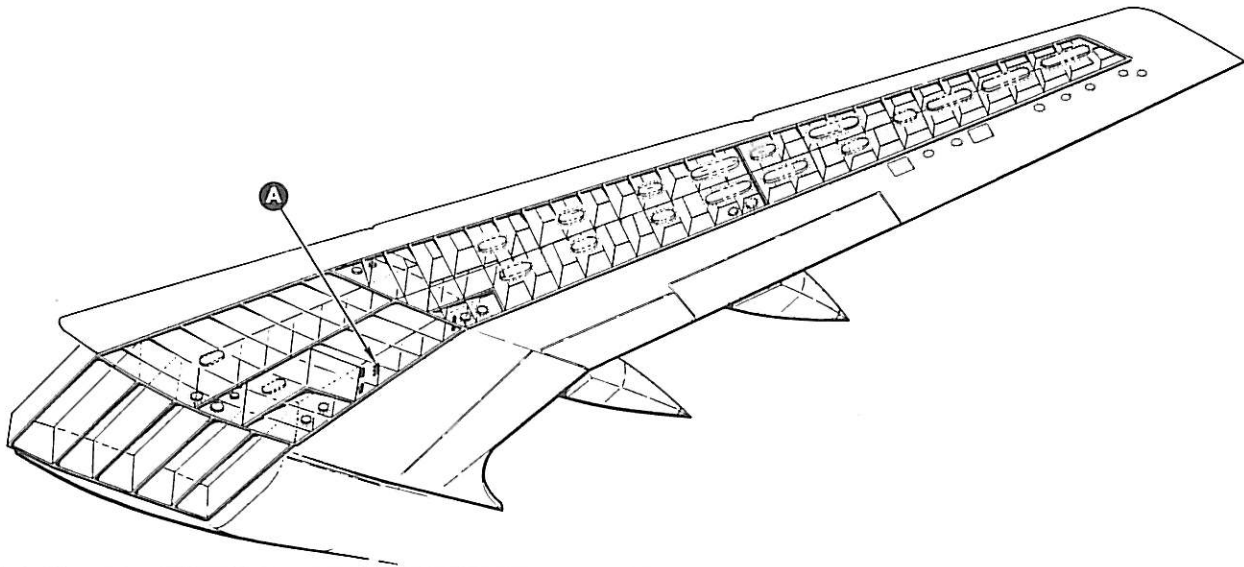
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JETTISON SYSTEM VALVES - MAINTENANCE PRACTICES

1. Removal/Installation Hydraulic Pump Motor Control Valve (see Figure 201)
 - A. Equipment Required. Suitable container for trapping residual hydraulic fluid when lines are disconnected.
 - B. Prepare for Replacement of Hydraulic Pump Control Valve.
 - (1) Open FUEL JETTISON VALVE and FUEL SCAVENGE VALVE circuit breakers on main circuit breaker panel. Place warning tag on circuit breakers.
 - (2) Open trailing edge access door.
 - C. Remove Hydraulic Pump Motor Control Valve.
 - (1) Disconnect electrical plug from control valve. (Cover plug and receptacle.)
 - (2) Reduce hydraulic pressure to 0 psi; refer to Chapter 29, HYDRAULIC POWER.
 - (3) Disconnect four hydraulic lines from control valve. (Cover lines and control valve ports.)
 - (4) Remove three bolts attaching control valve to structure and remove valve.

NOTE: Attaching bolts for outboard control valve installation screw into plate nuts on mounting bracket. Free nuts are used in inboard valve installation.
 - D. Install Hydraulic Motor Control Valve.
 - (1) Position valve on mounting bracket and install three attachment bolts.
 - (2) Connect four hydraulic lines to valve. Exercise care to prevent dirt and foreign matter from entering system.
 - (3) Connect electrical plug to control valve.
 - (4) Fill and bleed hydraulic system; refer to Chapter 12, SERVICING, and Chapter 29, HYDRAULIC POWER.
 - (5) Remove warning tag and close circuit breakers.
 - (6) Perform functional test; refer to 28-5-0.

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Jettison Pump Hydraulic Motor
Control Valve Installation
Figure 201

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2. Removal/Installation Fuel Jettison Shutoff Valve

NOTE: Refer to 28-5-0, Figure 5 for an illustration of the jettison shutoff valve.

A. Equipment Required - None.

B. Prepare for Replacement of Valve.

- (1) Remove two access plates at outboard ASB station 235.
- (2) Disconnect three jettison lines, vent line, and sensing line at couplings (station 230).
- (3) Support tailcone and remove eight hex head attaching screws.
- (4) Remove tailcone and cap all open lines.

C. Remove Valve.

- (1) Disconnect bonding jumper from valve.
- (2) Disconnect bonding jumper from short tube between valve and fuel tight bulkhead (station 212.0).
- (3) Disconnect Wiggins couplings at both ends of tube and remove tube; refer to 28-0 (cap open tube and valve ports).
- (4) Remove nut attaching valve to rear spar; remove valve and seal.

D. Install Valve.

- (1) Remove non-conducting material from support bulkhead, valve, and attaching nut.
- (2) Place seal on valve and insert valve through mounting hole. Install attaching nut finger tight.
- (3) Turn valve so that TOP marking is up and vertical center-line is within two degrees of perpendicular. Torque attaching nut to 30 (± 3) foot-pounds.
- (4) Position tube and connect both Wiggins couplings, refer to 28-0.
- (5) Remove non-conducting materials and reconnect bonding jumpers to valve and tube.
- (6) Position ASB tailcone and install eight attaching screws.
- (7) Connect jettison, vent, and sensing lines at station 230.
- (8) Perform functional test; refer to 28-5-0.

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FUEL JETTISON NOZZLES - MAINTENANCE PRACTICES

1. Removal/Installation Fuel Jettison Nozzle (see 28-5-0, Figure 4)
 - A. Equipment Required - None.
 - B. Prepare for Nozzle Replacement.
 - (1) Remove corresponding anti-shock body tailcone; refer to 28-5-1, paragraph 2, step B.
 - (2) Remove 12 flush screws and fairing from tip of tailcone; see 28-5-0, Figure 4.
 - C. Remove Fuel Jettison Nozzle.
 - (1) Remove six jettison nozzle mounting bracket screws.
 - (2) Disconnect three jettison nozzle couplings and remove nozzle from tailcone.
 - D. Install Fuel Jettison Nozzle.
 - (1) Position nozzle and connect nozzle couplings.
 - (2) Install and tighten nozzle mounting bracket screws.
 - (3) Tighten nozzle couplings.
 - (4) Install tailcone tip fairing.
 - (5) Install tailcone and reconnect tubing; refer to 28-5-1, paragraph 2, step D.
 - (6) Leak test piping in tailcone section; refer to 28-5-0.

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FUEL JETTISON PUMPS - MAINTENANCE PRACTICES

1. Removal/Installation Fuel Jettison Pump Impeller and Hydraulic Motor Assembly (see Figure 201)

A. Equipment Required.

- (1) Suitable container for trapping residual hydraulic fluid.

B. Prepare for Replacement of Jettison Pump Impeller and Hydraulic Motor Assembly.

- (1) Drain fuel from applicable tank to a level below jettison pump housing.
- (2) Open appropriate wing trailing edge access door. Access to inboard and scavenge pumps is through the main wheel well.
- (3) Open and attach warning tag to FUEL JETTISON VALVE and FUEL SCAVENGE VALVE circuit breakers, on main circuit breaker panel.

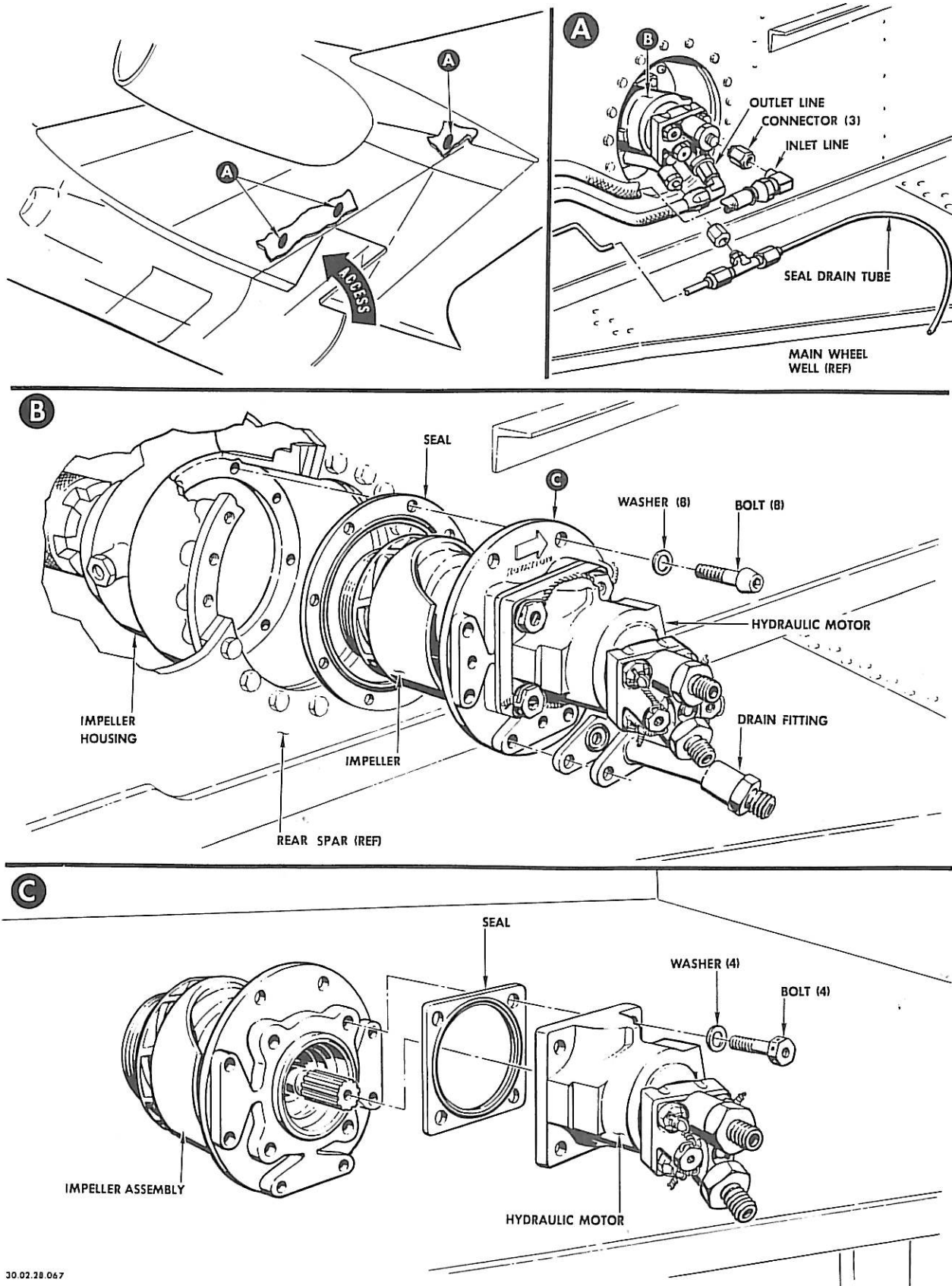
C. Remove Jettison Pump Impeller and Hydraulic Motor Assembly.

- (1) Disconnect inlet and outlet lines from hydraulic motor.
- (2) Disconnect seal drain tube from drain fitting on impeller assembly.
- (3) Remove eight bolts attaching impeller assembly to housing and remove assembly.
- (4) Remove lockwire and four bolts attaching hydraulic motor to impeller assembly. Remove hydraulic motor and seal. (Retain seal for installation, if serviceable.)
- (5) Cover opening in rear spar from which impeller and hydraulic motor assembly were removed.

D. Install Jettison Pump Impeller and Hydraulic Motor Assembly.

- (1) Clean mating surfaces of hydraulic motor and impeller.
- (2) Attach seal and hydraulic motor to impeller with four bolts, and lockwire.
- (3) Make sure inside of housing and mating surfaces of housing and impeller are clean.
- (4) Insert impeller and motor assembly into housing with impeller directional arrow at top; install eight attachment bolts.

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NOTE: Make sure washers are installed with countersunk side toward bolt head.

- (5) Connect seal drain tube to drain fitting on impeller assembly.
- (6) Connect pressure and return lines to hydraulic motor inlet and outlet ports respectively.
- (7) Remove warning tag and close circuit breakers.
- (8) Service and bleed hydraulic system; refer to Chapter 12, SERVICING.
- (9) Perform functional test; refer to 28-5-0.

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CENTER TANK BOOST/JETTISON PUMPS - MAINTENANCE PRACTICES1. Removal/Installation Boost/Jettison Pump Impeller and Hydraulic Motor Assembly (see Figure 201)

A. Equipment Required.

- (1) Suitable container for trapping residual hydraulic fluid.

B. Prepare for Replacement of Boost/Jettison Pump Impeller and Hydraulic Motor.

- (1) Defuel center tank to a level below boost/jettison pumps; refer to Chapter 12, SERVICING.

NOTE: If only the hydraulic motor is to be removed, defueling will not be necessary.

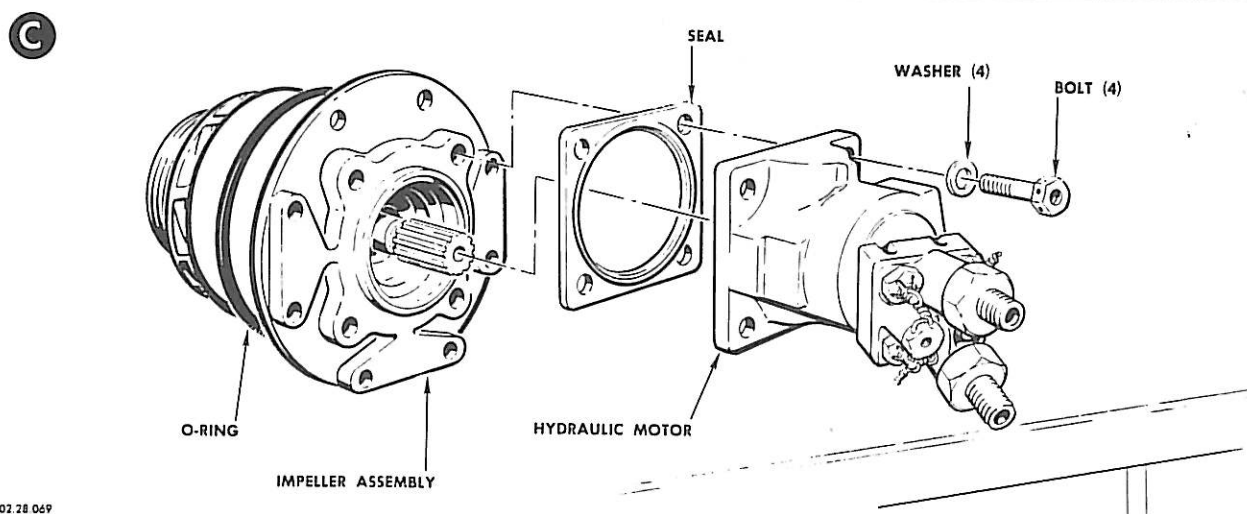
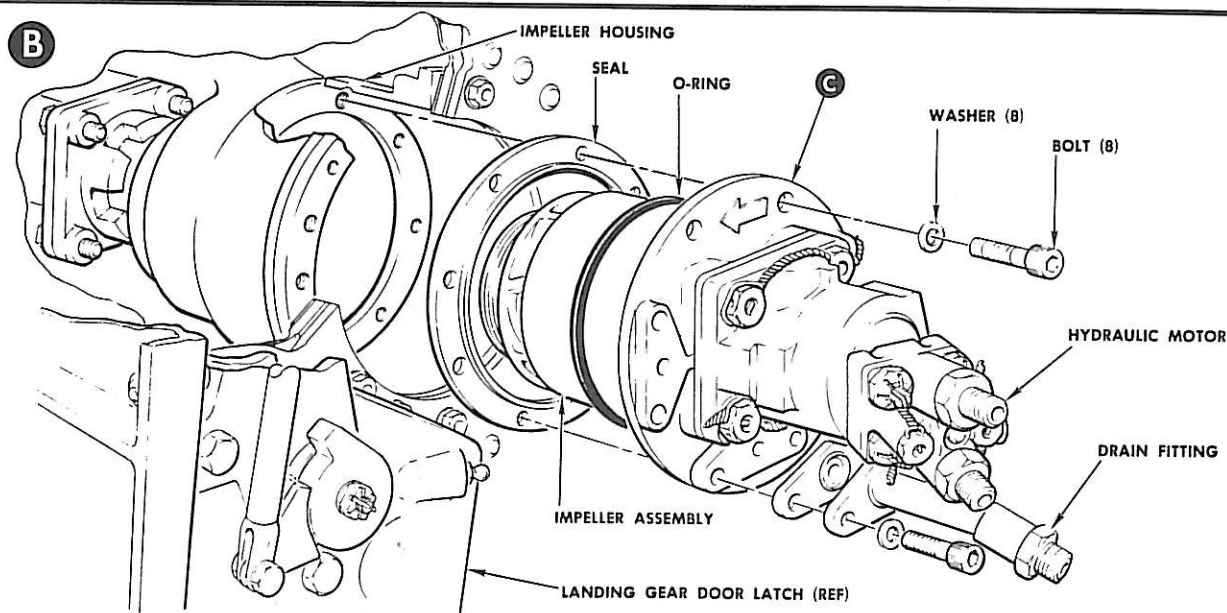
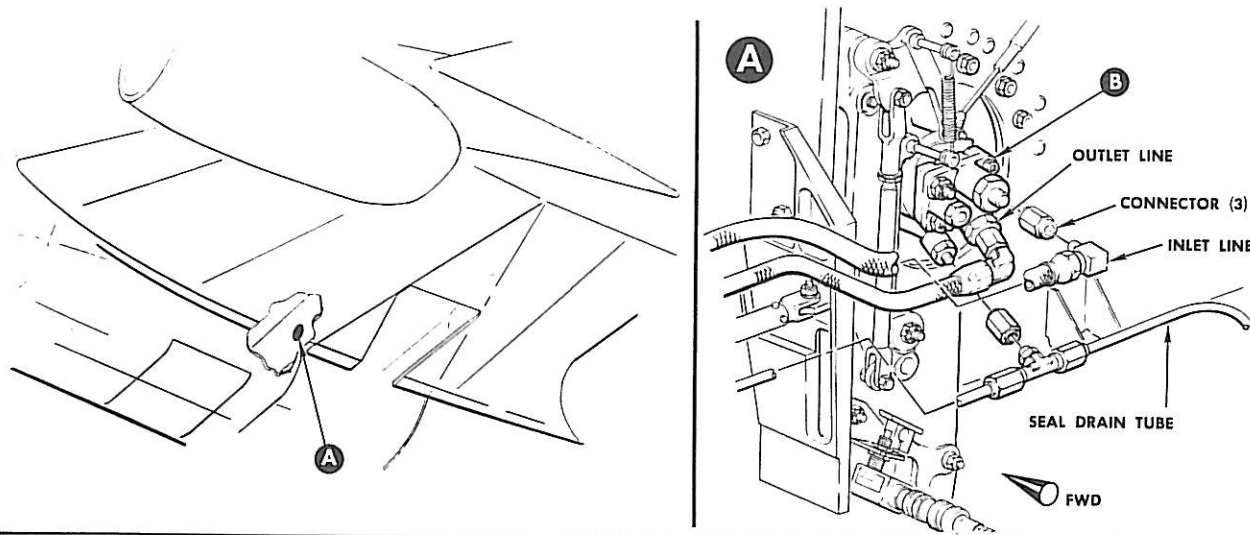
- (2) Open and attach warning tags on FUEL AUXILIARY CENTER SECTION BOOST-JETTISON PUMPS LH and RH circuit breakers, on main circuit breaker panel.

C. Remove Boost/Jettison Pump Impeller and Hydraulic Motor.

- (1) Disconnect pressure and return lines from hydraulic motor.
- (2) Disconnect seal drain tube from impeller assembly.
- (3) Remove four bolts attaching hydraulic motor to impeller assembly. Remove hydraulic motor.
- (4) Remove main landing gear door latch. (Prior to removal mark location of latch relative to structure; this is to prevent the necessity of rigging door on re-assembly); refer to Chapter 32, LANDING GEAR.
- (5) Remove eight bolts attaching impeller assembly to housing and remove assembly.

D. Install Boost/Jettison Pump Impeller and Hydraulic Motor.

- (1) Clean impeller assembly and inside of pump housing. Position impeller assembly in housing using a new O-ring. Install and tighten eight bolts to a torque value of 35 to 50 inch-pounds.
- (2) Install main landing gear door latch; refer to Chapter 32, LANDING GEAR.
- (3) Clean mating surfaces of seal, impeller assembly, and hydraulic motor. Position seal and motor on impeller assembly with motor ports facing outboard. Install and safety wire four bolts.



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- (4) Connect seal drain tube to drain fitting on impeller assembly.
 - (5) Connect pressure and return lines to motor inlet and outlet ports, respectively.
 - (6) Disconnect pump pressure line at first joint away from pump motor. Fill section of line between this joint and motor with hydraulic fluid, then reconnect line.
- CAUTION: MAKE SURE PUMP MOTOR IS FILLED WITH HYDRAULIC FLUID (PRIMED) BEFORE OPERATING. THE MOTOR WILL BE DAMAGED IF OPERATED DRY.
- (7) Service and bleed hydraulic system; refer to Chapter 12, SERVICING.
 - (8) Perform functional test of pump; refer to 28-5-0.
 - (9) Refuel center tank; refer to Chapter 12, SERVICING.
 - (10) Remove warning tags and close circuit breakers opened in B.(2).



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2. Removal/Installation Boost/Jettison Pump Housing (see Figure 202)

A. Equipment Required - None.

B. Prepare for Replacement of Pump Housing.

(1) Defuel center tank; refer to Chapter 12, SERVICING.

(2) Open and attach warning tag to CENTER TANK FUEL AUXILIARY CENTER SECTION JETTISON VALVE circuit breakers, on main circuit breaker panel.

C. Remove Boost/Jettison Pump Housing.

(1) Remove pump impeller and motor assembly; refer to 28-5-4.

(2) Disconnect pressure sensing line at pump outlet (top of pump housing).

(3) Remove elbow at pump outlet. Leave elbow connected to discharge tubing.

(4) Remove 16 housing attachment bolts at aft side of rear spar while supporting housing in fuel cell, using care to prevent dropping parts and damaging cell. Retain seal for installation, if serviceable.

(5) Note position of bellmouth assembly in relation to housing, and remove bellmouth from pump inlet. Retain inner and outer seal for installation, if serviceable.

D. Install Boost/Jettison Pump Housing.

(1) Install bellmouth assembly and seal on pump inlet of housing, in position noted when removed.

(2) Clean mating surface and seal, and install outer seal on exterior surface of fuel cell pump opening, with two screws.

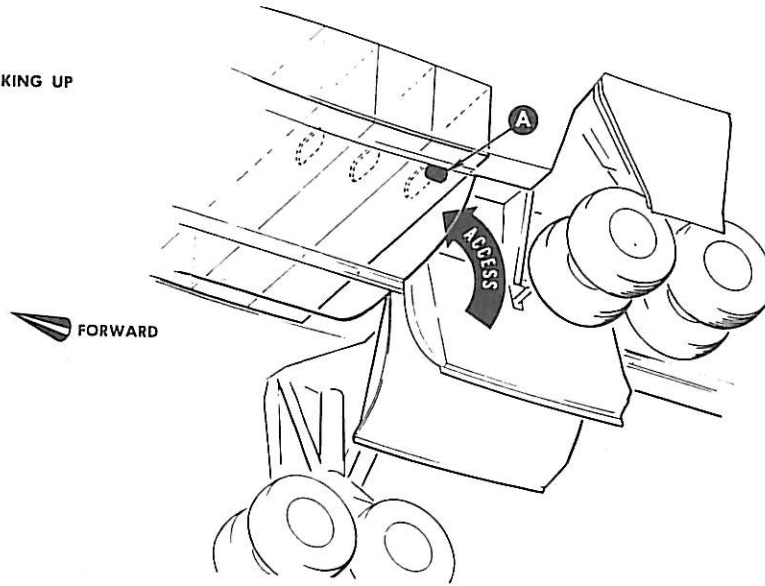
(3) Position pump housing at pump opening with inner seal, bellmouth pointed downward.

(4) Install 16 bolts, making sure that any nonconductive material is removed from under bolt heads, and from mating surfaces.

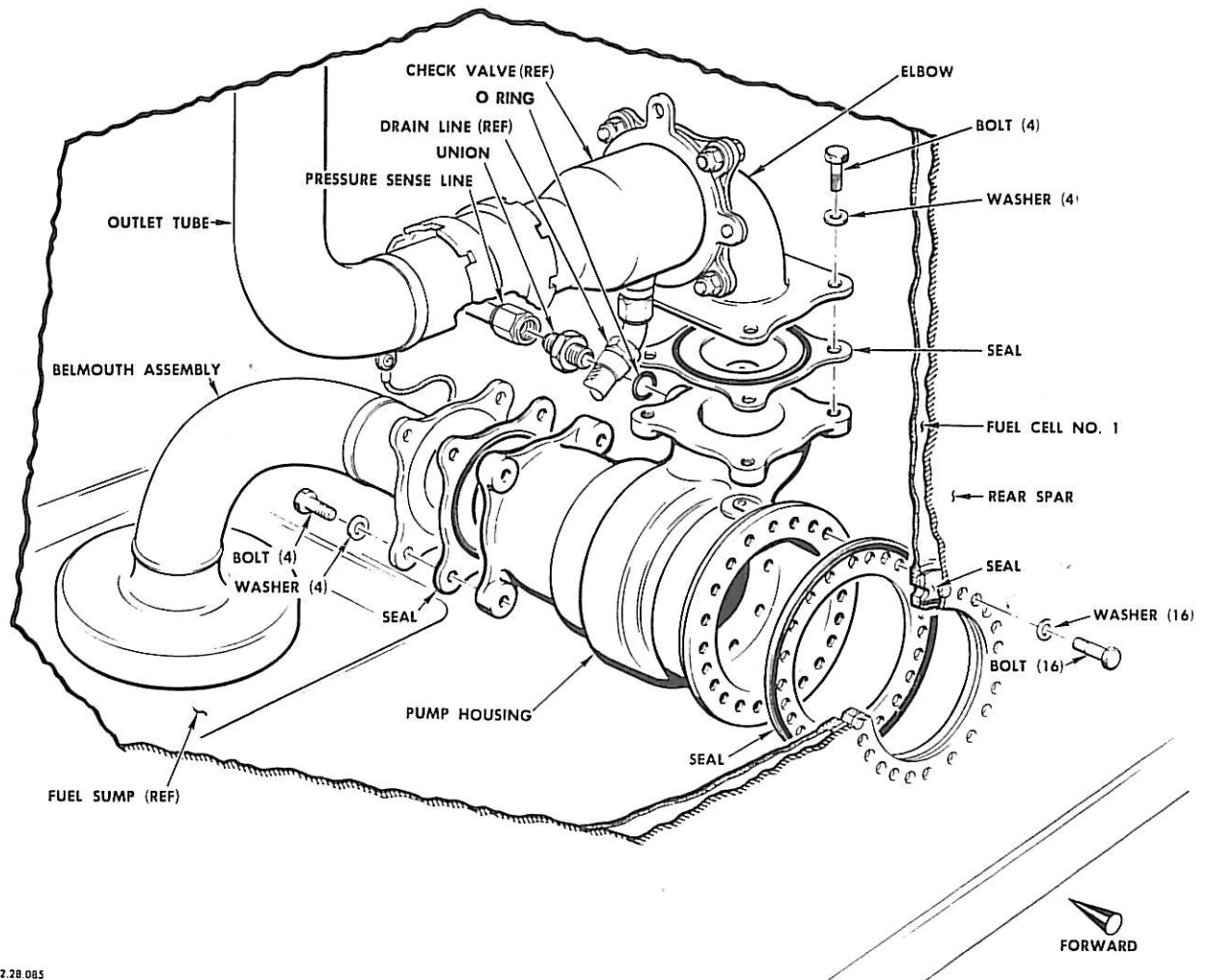
(5) Connect pressure sensing line to fitting at pump outlet.

(6) Install elbow at pump outlet, with seal.

VIEW LOOKING UP



A VIEW LOOKING DOWN, FORWARD AND INBOARD



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- (7) Leak test pump housing installation; refer to Adjustment/Test Center Section Fuel Cells - Leak Test (Cells Installed in Airplane).
- (8) Remove all foreign material from inside fuel cell and replace access panel.
- (9) Install pump impeller and motor assembly; refer to 28-5-4.
- (10) Refuel center tank; refer to Chapter 12, SERVICING.

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FUEL QUANTITY GAGING SYSTEM - DESCRIPTION AND OPERATION

1. General

The fuel quantity gaging system is the Simmonds capacitance-type, using characterized probes in each fuel tank. There are a total of 12 indicator gages, 11 on airplanes CV1 through CV25, which continuously indicate fuel quantity in corresponding tanks. A single (totalizer) indicator on the pilots' center instrument panel, not installed on airplanes CV1 through 25, shows total fuel for all tanks. Five of the indicators are on the flight engineer's fuel control panel, one for each tank system No. 1, 2, 3, and 4, and one for the auxiliary center section tank. A switch on the panel, spring-loaded to TOTAL, is to select TOTAL, MAIN, REPLENISH, or ANTI-SHOCK BODY, for readings from the No. 1, 2, 3 and 4 tank indicators; the center section tanks indicator is read only for TOTAL fuel. The left and right wing refuel control panels each have three repeater indicators which reflect the amount of fuel indicated by the corresponding indicator on the fuel control panel. One of the repeaters on each refuel control panel is connected to the single indicator for the center section tank; both reflect the amount of center section tank fuel, so that the information is available at either wing. The repeater indicators are dialed for the amount of fuel to be pumped into the corresponding tank. System operating power is supplied by the 115-volt, 400 cycle ac essential bus. See Figure 1 for a schematic of the fuel gaging system.

The indicators are adjustable for range and calibration. Adjustments of the indicator pointers are such that a change in the "full" adjustment will not appreciably affect the position of the indicator pointer at the "zero" point. The adjustments are of sufficient range to compensate for all manufacturing tolerances in the system and in the fuel tanks, and provide a sensitivity such that adjustments can be accomplished under service operations. Fuel compensators (monitors) are used to accommodate fuels of wide specific gravity range, and to compensate for varying temperatures.

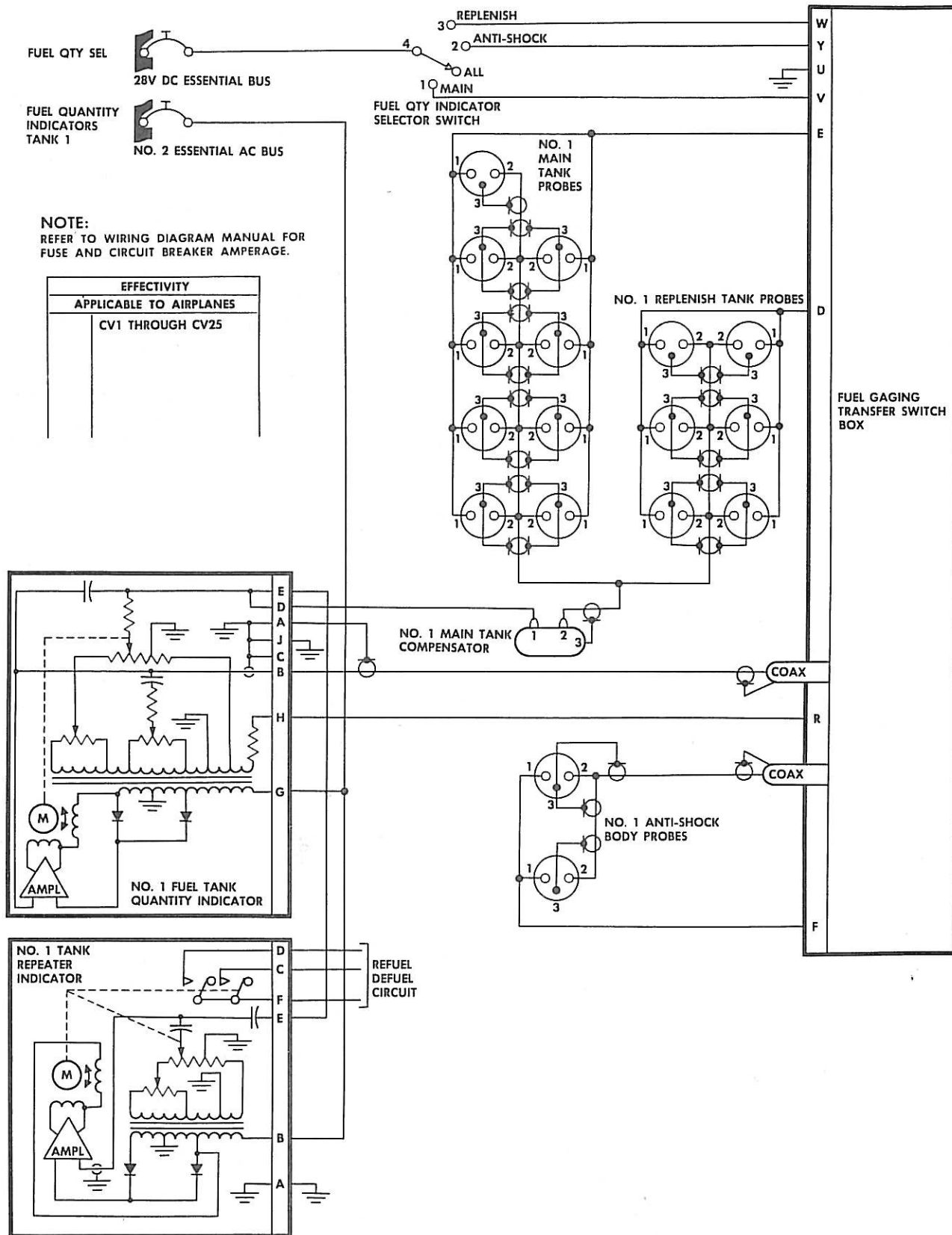
Fuel measure is accomplished on a weight basis, rather than in gallons. The number of probes in the tanks assure that errors introduced by sustained flight attitudes, other than level, shall not exceed four percent of indication plus two percent full scale indication.

In addition to the electrical gaging system there are a total of 21 liquid sight gages, installed in the lower surfaces of the tanks. One is in the center cell of the center section tank, one is in each ASB, and two are in each main and in each replenishment tank. The gages are used to manually check the fuel level while the airplane is on the ground.

2. Fuel Quantity Probes

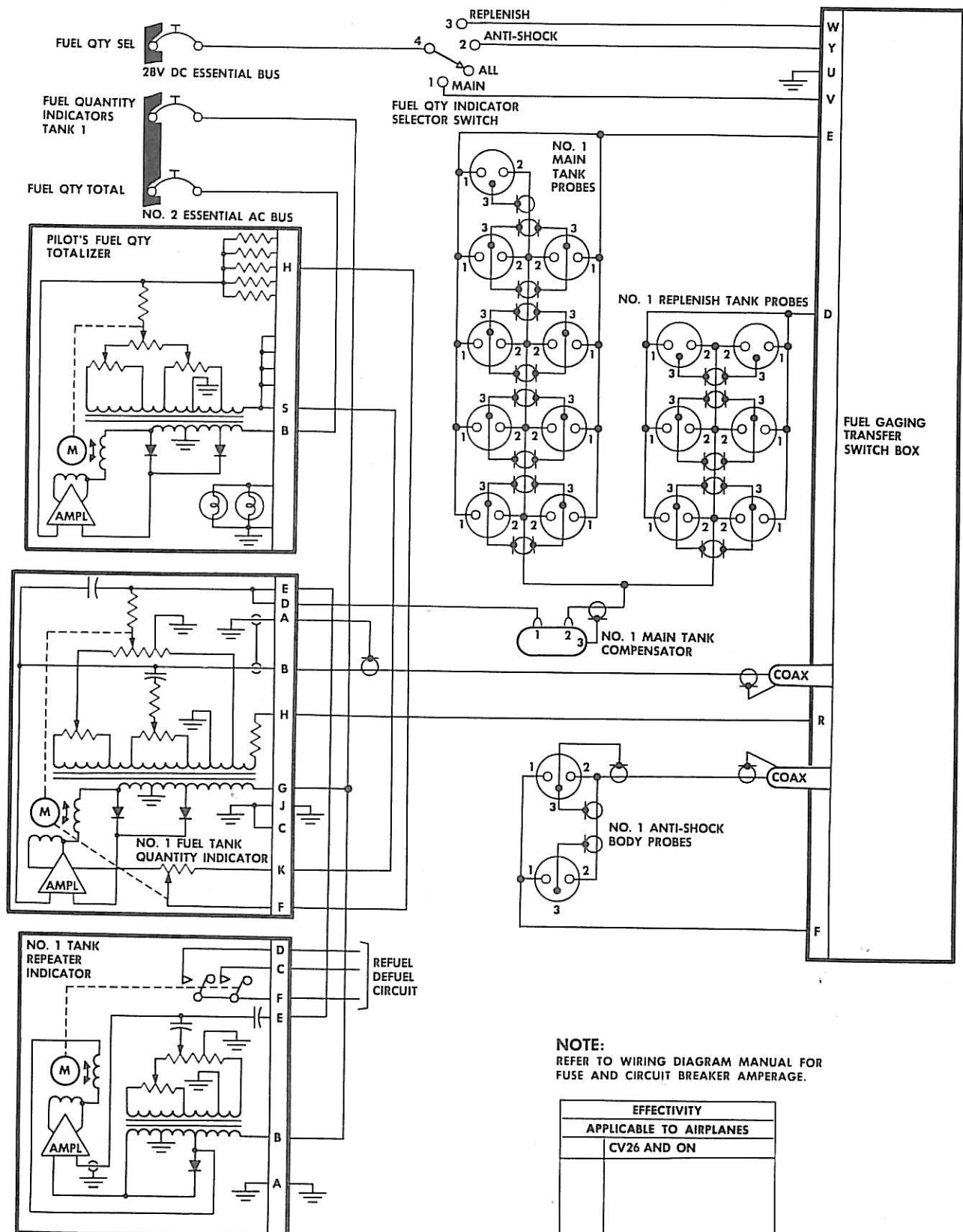
There are a total of sixty characterized probes in the tanks: nine in the No. 1 and 4 main tanks, five in the No. 2 and 3 main tanks, six in the No. 1 and 4 replenishment tanks, four in the No. 2 and 3 replenishment tanks, two in the right and left outboard ASB's, one in the right and left inboard ASB's, and six in the center section tank. Locations of all probes are shown on Figure 2. "Characterized" means that the active area of the probes is

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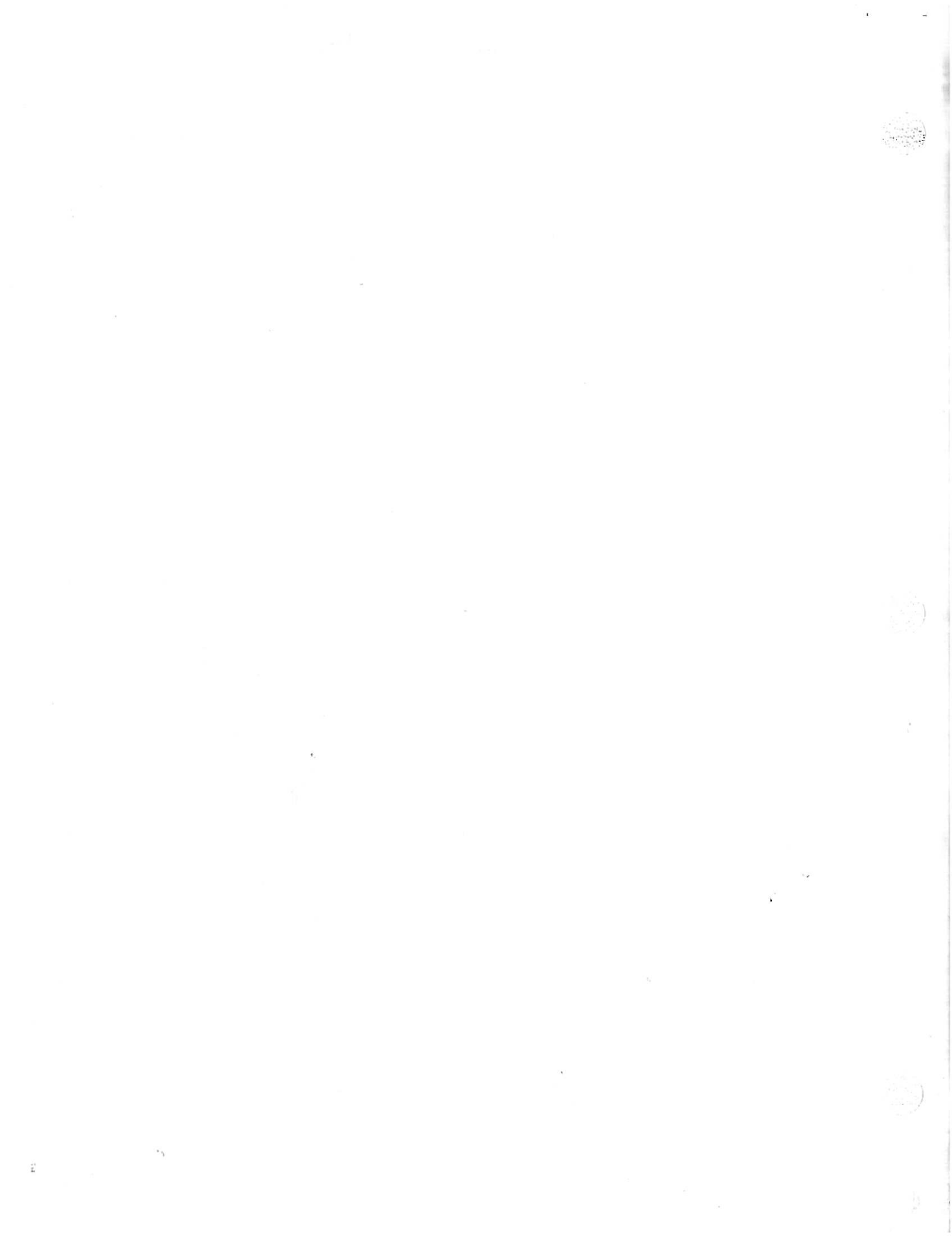


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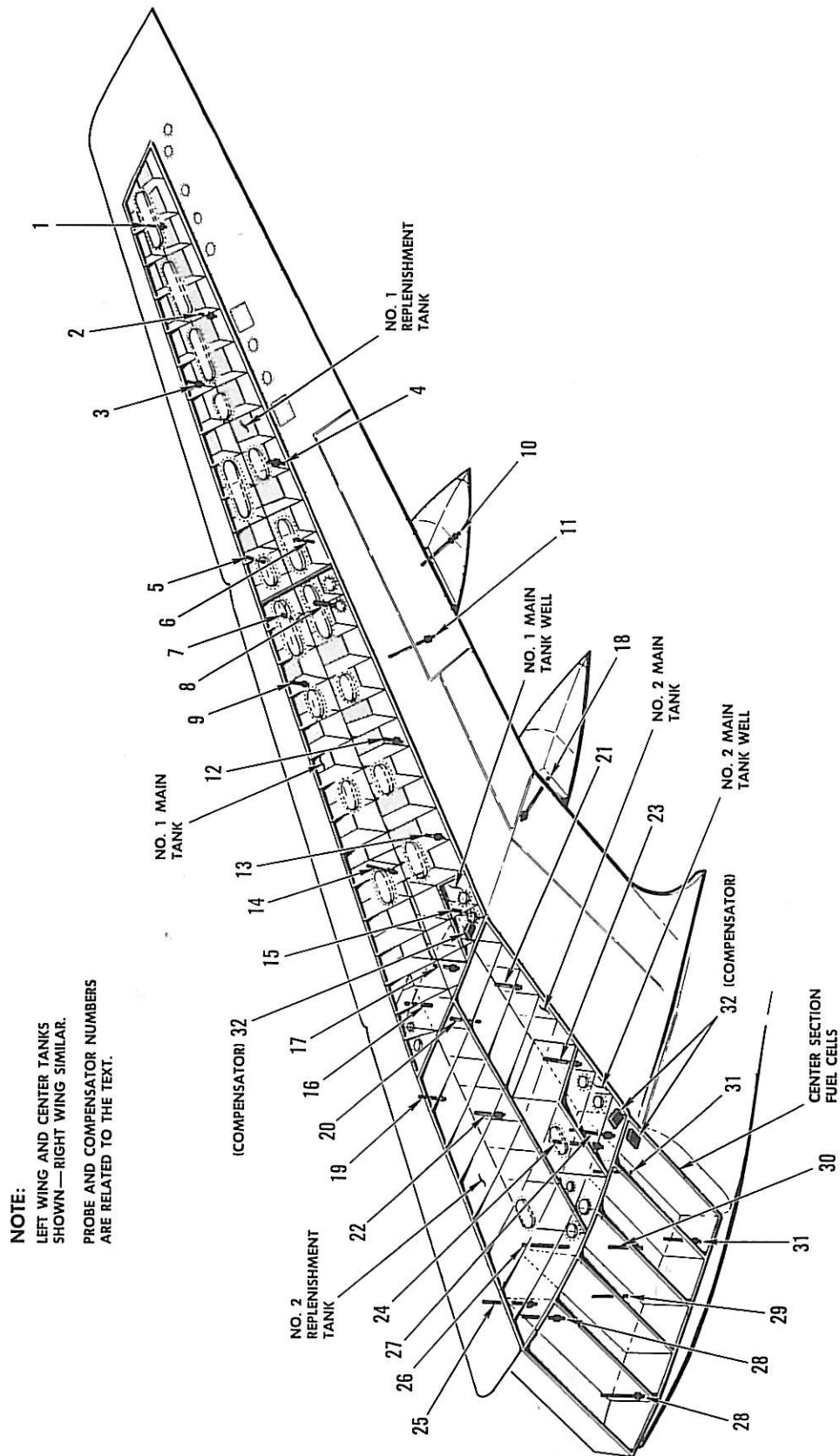
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Fuel Gaging System Electrical Schematic
Figure 1 (Sheet 2 of 2)

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Fuel Quantity Probe and Compensator Locations
Figure 2

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varied from top to bottom to give accurate readings for a nonsymmetrical tank. The level of fuel in a probe changes the capacitance between the plates of the capacitor, which unbalances an inductance bridge. A two-phase servo motor drives the corresponding fuel gage pointer, to indicate the fuel quantity, and a follow-up potentiometer to rebalance the inductance bridge. A typical probe is shown on 28-6-1, Figure 201.

3. Fuel Quantity Indicators

Five individual tank indicators located on the flight engineer's fuel control panel indicate optionally, via a four position tank selector, TOTAL, MAIN, ANTI-SHOCK BODY, or REPLENISH for each wing tank system and TOTAL for the center section system. Three repeater indicators are mounted on each wing rear spar refuel control panel, aft of the refuel adapters. The repeater indicators reflect the same amount of fuel as their corresponding tank indicators; one repeater on each refuel control panel is connected to the single indicator for the center section tank. All of the indicators incorporate an amplifier. In addition to the standard gage needle, a preset needle is incorporated on each repeater indicator. This preset needle is set for the amount of fuel desired in each tank. When the selected amount of fuel has been pumped into a tank, two contacts on the repeater indicator close to energize corresponding solenoid valves, which are then opened to allow fuel from the adapter fitting of the refueling system to fill float chambers of the refueling system refuel pilot valve. When the floats shut off their corresponding pilot valves, backpressure in the refuel shutoff valve builds up to close the valve, shutting off fuel flow from the tanker.

In addition to their pointers, the flight engineer's indicators incorporate drum-type rollers which indicate the total amount of fuel.

4. Fuel Quantity Compensators

The fuel compensator (monitor) in each main tank is located at the low point in its tank so that it is always covered by fuel. These compensators are electrically connected to the indicators. When the probes in a tank system send a fuel level signal to the indicator, the compensator measures the dielectric of the fuel being used and sends a modifying signal to compensate for the different specific gravity and temperatures. This assures an accurate measure of fuel, regardless of fuel type or temperature. A typical compensator is shown on 28-6-1, Figure 201.

5. Liquid Sight Gages

Each gage assembly incorporates a calibrated tube which slides in a sleeve assembly, and the combination is installed in a housing permanently attached to the wing lower surface. When a gage is in the stowed position, a Teflon dust seal around the edge of the butt plate prevents the entrance of foreign material. On airplanes CV26 and on, a special tool, incorporating a plastic bottle for trapping fuel, is used to release the tube assemblies for gaging. On airplanes CV1 through CV25, the tube assembly can be released by pressing and turning the butt plate by hand; use of the special tool and plastic bottle to trap the dripping fuel is optional. When it is necessary to check the fuel level, a gage tube is released from its stowed position, lowered until fuel spills over the upper end of the tube, moved



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upward again to stop spillage, and the fuel content of the tank is then read from the calibrated markings on the tube. A typical sight gage is shown in 28-6-4, Figure 201.

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FUEL QUANTITY GAGING SYSTEM - TROUBLE SHOOTING

<u>POSSIBLE CAUSE</u>	<u>ISOLATION PROCEDURE AND CORRECTION</u>
1. <u>NO INDICATION FROM FLIGHT ENGINEER'S FUEL QUANTITY INDICATOR AND CORRESPONDING REPEATER INDICATOR</u>	
A. Defective corresponding FUEL QUANTITY INDICATOR circuit breaker.	Check for presence of power through circuit breaker. If no power, replace circuit breaker.
B. Defective wiring between FUEL QUANTITY INDICATOR circuit breaker and flight engineer's fuel quantity indicator.	Check for continuity through wiring. If no continuity, repair or replace wiring.
C. Flight engineer's fuel quantity indicator defective.	Replace indicator with one known to be operable. If indication is obtained, calibrate new indicator; refer to Adjustment/Test - System Calibration. Permanently install indicator.
D. Defective wiring between flight engineer's fuel quantity indicator and fuel gaging transfer switch box.	Check for continuity through wiring. Repair or replace wiring.
2. <u>INDICATION FROM FLIGHT ENGINEER'S FUEL QUANTITY INDICATOR, BUT NO INDICATION FROM CORRESPONDING REPEATER INDICATOR</u>	
A. Defective wiring between flight engineer's fuel quantity indicator and repeater indicator.	Check for continuity through wiring. If no continuity, repair or replace wiring.
B. Defective repeater indicator.	Replace repeater indicator with one known to be operable. Calibrate indicator; refer to Adjustment/Test - System Calibration. Install indicator permanently.
3. <u>NO CHANGE IN INDICATION, OR ERRATIC INDICATION, FROM FLIGHT ENGINEER'S FUEL QUANTITY INDICATORS WHEN FUEL SELECTOR SWITCH IS PLACED IN 'MAIN' OR 'REPLENISH' POSITION</u>	
A. Defective FUEL QTY SEL circuit breaker.	Check for presence of power through circuit breaker. If no power, replace circuit breaker.
B. Defective wiring between FUEL QTY SEL circuit breaker and FUEL QUANTITY indicator selector switch.	Check for continuity through wiring. If no continuity, repair or replace wiring.

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POSSIBLE CAUSEISOLATION PROCEDURE AND CORRECTION

3. NO CHANGE IN INDICATION, OR ERRATIC INDICATION, FROM FLIGHT ENGINEER'S FUEL QUANTITY INDICATORS WHEN FUEL SELECTOR SWITCH IS PLACED IN 'MAIN' OR 'REPLENISH' POSITION (CONT)
- | | |
|--|--|
| C. Defective FUEL QUANTITY indicator selector switch. | Check for continuity through switch in MAIN position and in REPLENISH position. If no continuity, replace switch. |
| D. Defective wiring between FUEL QUANTITY indicator selector switch and fuel gaging transfer switch box. | Check for continuity through wiring. If no continuity, repair or replace wiring. |
| E. Defective fuel gaging transfer switch box. | <p>(1) Disconnect electrical plug from transfer switch box and check for continuity between the following pins of the receptacle on the transfer switch box; F-R, F-D, F-E, C-N, C-A, C-B, J-P, J-H, J-G, M-S, M-K, and M-L. If no continuity through one or more of above pin combinations, replace transfer switch box.</p> <p>(2) Disconnect the four coax cables from Dage connectors J102, J103, J104, and J105. Check for continuity as follows:</p> <p>(a) Apply 28 volts dc to pin V of receptacle, and check for continuity between pin D and shell of Dage connector J102, pin A and shell of Dage connector J103, pin G and shell of Dage connector J104, and pin K and shell of Dage connector J105.</p> <p>(b) Apply 28 volts dc to pin W of receptacle, and check for continuity between pin F and shell of Dage connector J102, pin C and shell of Dage connector J103, pin J and shell of Dage connector J104, and pin M and shell of Dage connector J105.</p> |

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POSSIBLE CAUSEISOLATION PROCEDURE AND CORRECTION

3. NO CHANGE IN INDICATION, OR ERRATIC INDICATION, FROM FLIGHT ENGINEER'S FUEL QUANTITY INDICATORS WHEN FUEL SELECTOR SWITCH IS PLACED IN 'MAIN' OR 'REPLENISH' POSITION (CONT)

- (c) Apply 28 volts dc to pin Y of receptacle, and check for continuity between pin E and shell of Dage connector J102, pin B and shell of Dage connector J103, pin H and shell of Dage connector J104, and pin L and shell of Dage connector J105.

If no continuity between one or more of above combinations, replace transfer switch box.

- (3) Ground pins F, C, J, M, K, G, D, and A. Apply 28 volts dc to pin V. Using a capacitance bridge, check for given capacitance value between following points:

- (a) Pin R and center conductor of Dage connector J102 - 170.1 (± 0.3) uuf.
(b) Pin N and center conductor of Dage connector J103 - 238.6 (± 0.3) uuf.
(c) Pin P and center conductor of Dage connector J104 - 238.6 (± 0.3) uuf.
(d) Pin S and center conductor of Dage connector J105 - 170.1 (± 0.3) uuf.

If one or more capacitance values is not within tolerance given, replace transfer switch box.

- (4) Ground pins F, C, J, M, L, H, E, and B. Apply 28 volts dc to pin W. Using a capacitance bridge, check for given capacitance value between following points:

- (a) Pin R and center conductor of Dage connector J102 - 334.2 (± 0.3) uuf.

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POSSIBLE CAUSEISOLATION PROCEDURE AND CORRECTION

3. NO CHANGE IN INDICATION, OR ERRATIC INDICATION, FROM FLIGHT ENGINEER'S FUEL QUANTITY INDICATORS WHEN FUEL SELECTOR SWITCH IS PLACED IN 'MAIN' OR 'REPLENISH' POSITION (CONT)

- (b) Pin N and center conductor of Dage connector J103 - 262.2 (± 0.3) uuf.
- (c) Pin P and center conductor of Dage connector J104 - 262.2 (± 0.3) uuf.
- (d) Pin S and center conductor of Dage connector J105 - 334.2 (± 0.3) uuf.

If one or more capacitance values is not within tolerance given, replace transfer switch box.

- (5) Ground pins K, G, D, A, L, H, E, and B. Apply 28 volts dc to pin Y. Using a capacitance bridge, check for given capacitance value between following points.

- (a) Pin R and center conductor of Dage connector J102 - 338.5 (± 0.3) uuf.
- (b) Pin N and center conductor of Dage connector J103 - 388.4 (± 0.3) uuf.
- (c) Pin P and center conductor of Dage connector J104 - 388.4 (± 0.3) uuf.
- (d) Pin S and center conductor of Dage connector J105 - 338.5 (± 0.3) uuf.

If one or more capacitance values is not within tolerance given, replace transfer switch box.

4. *NO INDICATION FROM PILOT'S FUEL QUANTITY INDICATOR

- A. Defective FUEL QTY TOTAL circuit breaker.

Check for presence of power through FUEL QTY TOTAL circuit breaker. If no power, replace circuit breaker.

* Applicable to airplanes CV26 and on.

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POSSIBLE CAUSEISOLATION PROCEDURE AND CORRECTION4. *NO INDICATION FROM PILOTS' FUEL QUANTITY INDICATOR (CONT)

- B. Defective wiring between one or more flight engineer's fuel quantity indicators and pilots' fuel quantity indicator.

Check for continuity through wiring. If no continuity, repair or replace wiring.

- C. Pilot's fuel quantity indicator defective.

Replace indicator with one known to be operable. Calibrate indicator; Adjustment/Test - System Calibration. Install indicator permanently.

5. *INDICATION FROM PILOTS' FUEL QUANTITY INDICATOR IS LESS THAN TOTAL OF INDICATIONS FROM FLIGHT ENGINEER'S FUEL QUANTITY INDICATORS

- A. Defective wiring between one or more of flight engineer's fuel quantity indicators and pilots' fuel quantity indicator.

Check for continuity through wiring. If no continuity, repair or replace wiring.

- B. Pilot's fuel quantity indicator out of adjustment or defective.

Calibrate pilots' indicator; refer to Adjustment/Test - System Calibration. If correct indication cannot be obtained, replace pilots' indicator with one of known performance. Calibrate pilots' indicator; refer to Adjustment/Test System Calibration. Install indicator permanently.

6. FLIGHT ENGINEER'S FUEL QUANTITY INDICATOR(S) GIVE ERRATIC OR OBVIOUSLY INCORRECT INDICATION

- A. Loose connection.

Make continuity check of associated circuitry, moving wires at terminals and connectors to detect faulty connection. Make proper connection.

- B. Defective fuel probe or compensator.

Check capacitance values of probes and compensators; refer to Adjustment/Test - System Dry Capacitance Check. If capacitance value of compensator is lower than standard value given, replace compensator. If capacitance value for probes is lower than standard value given, isolate replenishment tank; refer to Adjustment/Test - Main Tank/Replenishment Tank Dry Capacitance Test. Replace defective probe.

* Applicable to airplanes CV26 and on.



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POSSIBLE CAUSE

ISOLATION PROCEDURE AND CORRECTION

7. FLIGHT ENGINEER'S FUEL QUANTITY INDICATOR(S) HAVE SLOW RESPONSE

- | | |
|-------------------------------|--|
| A. Low insulation resistance. | Check associated circuitry for damaged or deteriorated insulation. Repair or replace wiring. |
|-------------------------------|--|

8. FLIGHT ENGINEER'S FUEL QUANTITY INDICATOR(S) PEG OUT AT TOP OF SCALE

- | | |
|------------------------------------|--|
| A. Coax cable shield not grounded. | Check associated circuitry for ungrounded coax cable shield. Ground as required. |
|------------------------------------|--|

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FUEL QUANTITY GAGING SYSTEM - MAINTENANCE PRACTICES

1. Adjustment/Test - System Calibration. (See Figures 201 and 202)

A. General.

Actual capacitance values of fuel probes installed in fuel tanks may differ from standard values due to accumulation of manufacturing tolerances. Actual capacitance values for compensators and fuel probes are recorded in each airplane's log book. The capacitance value of each compensator is listed individually; for the fuel probes, the sum of all probes in a tank (main, replenishment, or center tank) is listed. If available, actual values should be used during Adjustment/Test. Standard values given in Adjustment/Test steps may be used if actual values are not available.

B. Equipment Required.

- (1) External source of 115/220-volt, 3-phase, 400 cps, ac electrical power.
- (2) Tester - Simmonds No. 387016 or equivalent.
- (3) Test adapter harnesses; see Figures.

C. Prepare for System Calibration.

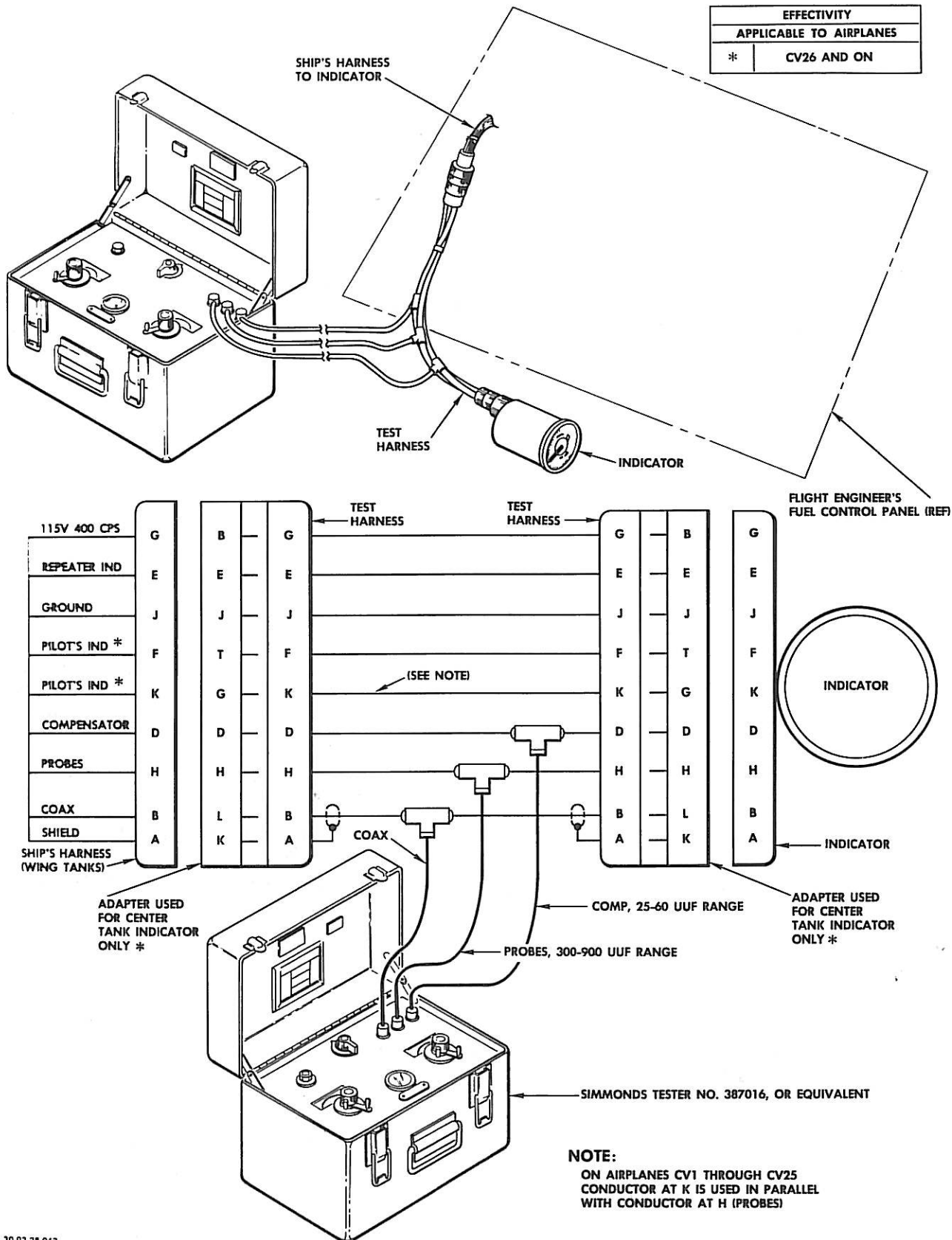
NOTE: An alternate, but less accurate, method of calibration for tank and repeater indicators may be used without defueling the airplane. For alternate method, disregard item E, and proceed to item F.

- (1) Defuel airplane; refer to Chapter 12, SERVICING.
- (2) Close FUEL QTY SEL circuit breaker, FUEL QUANTITY INDICATORS circuit breakers TANK 1, TANK 2, TANK 3, TANK 4, and CTR TANK, and REFUEL VALVES circuit breakers - LH, RH, and CTR. On airplanes CV26 and on, also close FUEL QTY TOTAL circuit breaker.
- (3) Connect external electrical power to airplane.

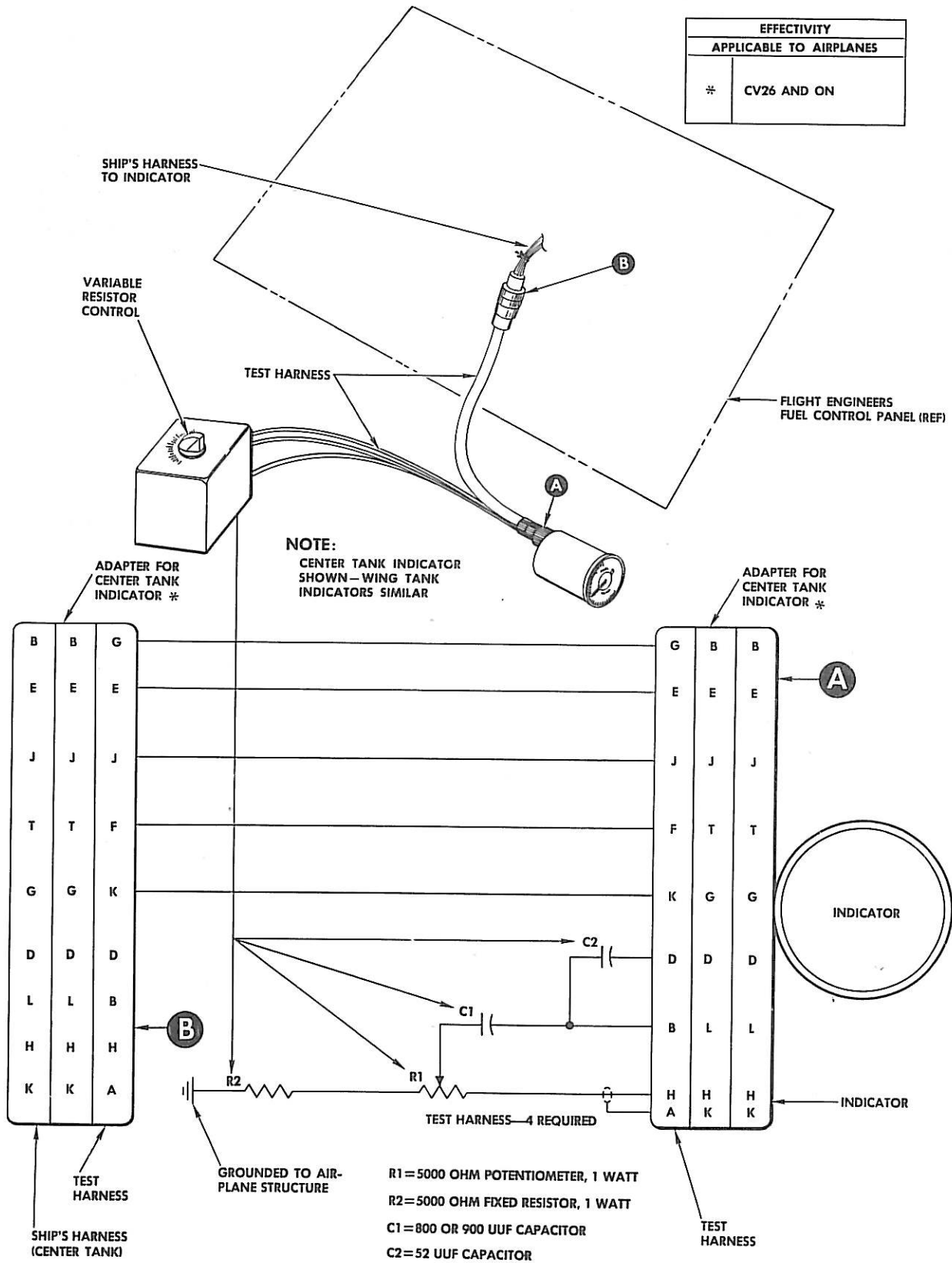
D. Perform Preliminary Check of Quantity Indicators.

- (1) Check that five fuel quantity indicators on the flight engineer's control panel read zero. Adjust indicators not reading zero at the zero adjustment screw on back of each indicator.
- (2) (Applicable to airplanes CV26 and on.) Check that pilots' total fuel indicator on the pilots' instrument panel reads zero. Adjust zero set as necessary.

EFFECTIVITY	
APPLICABLE TO AIRPLANES	
*	CV26 AND ON



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Fuel Quantity Indicator Test Harness
Connection (Typical)
Figure 202

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- (3) Check TANK 1, TANK 2, and CENTER SECTION AUX repeater on the left-hand refuel panel. Zero set indicators as required.
- (4) Check TANK 3, TANK 4, and CENTER SECTION AUX repeater on the right-hand refuel panel. Set indicators as required.
- (5) Hold FUEL QUANTITY switch on the flight engineer's control panel successively in the MAIN, REPLENISH, and ANTI-SHOCK BODY position long enough for indicators to stabilize. Release switch to TOTAL position. Indicators shall read * 0 (± 100) pounds, ** 0 (± 50) kgs, or *** 0 (± 100) pounds with the switch in the MAIN, REPLENISH, or ANTI-SHOCK BODY position.
- (6) Open circuit breakers closed in step C. (2), except REFUEL VALVES circuit breakers.

E. Calibrate Tank and Repeater Indicators - Preferred Method (Added Capacitance).

- (1) Disconnect electrical connector plug from TANK NO. 1 indicator on flight engineer's panel.
- (2) Connect test adapter harness between TANK NO. 1 indicator and ship's harness as shown on Figure 201.
- (3) Connect tester to adapter harness.
- (4) Place all tester control knobs at zero position.
- (5) Close FUEL QUANTITY INDICATOR TANK 1 circuit breaker.
- (6) TANK NO. 1 indicator shall indicate zero.
- (7) Set COMPENSATOR control on tester at 26.6 uuf.
- (8) Set UNITS (PROBES) control on tester at * 436.9 uuf, ** 558.3 uuf, or *** 575.5 uuf.
- (9) TANK NO. 1 indicator and TANK 1 repeater indicator shall indicate * 19,000 pounds, ** 11,000 kgs, or *** 25,000 pounds. Adjust indicators to these values at the FULL adjustment screw, on the back of each indicator, if necessary.
- (10) Repeat steps (7) through (9) until specified readings are obtained.

* Applicable to airplanes CV1, CV2, and CV5 through CV24.

** Applicable to airplanes CV26 through CV34.

*** Applicable to airplanes CV3, CV4, CV25, and CV35 and on.

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- (11) Set TANK 1 repeater indicator pre-select (rim pointer) successively at * 5,000, 10,000, and 15,000 pounds; ** 3,000, 7,000, and 10,000 kgs; or *** 6,000, 14,000, and 20,000 pounds.
- (12) Using the test box, adjust repeater indicators successively to values given in preceding step and listen for NO. 1 TANK fuel shutoff solenoids to actuate. Solenoids should actuate at set value * (± 100) pounds, ** (± 50) kgs, or *** (± 100) pounds.
- (13) Check and record the indicator EMPTY and FULL capacitance values as follows:
 - a. Disconnect three test leads at ship's harness side of connectors.
 - b. Set COMPENSATOR control on tester at 25.5 uuf.
 - c. Adjust UNITS control on tester until indicator reads zero. This value should be 421.6 (± 8.5) uuf. Do not adjust zero adjust screw on indicator.
 - d. Record EMPTY capacitance value in ships log book.
 - e. Set COMPENSATOR control on tester to 52.1 uuf.
 - f. Adjust UNITS control on tester until indicator reads * 19,000 pounds, ** 11,000 kgs, or *** 25,000 pounds. FULL capacitance value should be capacitance recorded in step (13) d. plus * 436.9 uuf, ** 558.3 uuf, or *** 575.5 uuf. Do not adjust full adjust screw on indicator.
 - g. Record FULL capacitance value in ship's log.
- (14) Open FUEL QUANTITY INDICATOR TANK NO. 1 circuit breaker.
- (15) Repeat steps (1) through (14) substituting the components for tank No. 4.
- (16) Disconnect electrical connector plug from TANK NO. 2 indicator on flight engineer's panel.
- (17) Connect test adapter harness between TANK NO. 2 indicator and ship's harness as shown on Figure 201.
- (18) Connect tester to adapter harness.
- (19) Place all tester control knobs at zero position.

* Applicable to airplanes CV1, CV2, and CV5 through CV24.

** Applicable to airplanes CV26 through CV34.

*** Applicable to airplanes CV3, CV4, CV25, and CV35 and on.

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- (20) Close FUEL QUANTITY INDICATOR TANK 2 circuit breaker.
- (21) TANK NO. 2 indicator shall indicate zero.
- (22) Set COMPENSATOR control on tester at 26.6 uuf.
- (23) Set UNITS control on tester at * 502.4 uuf, ** 519.2 uuf, or *** 535.3 uuf.
- (24) TANK NO. 2 indicator and TANK 2 repeater indicator shall indicate * 23,500 pounds, ** 11,000 kgs, or *** 25,000 pounds. Adjust indicators to these values at the FULL adjustment screw, on the back of each indicator, if necessary.
- (25) Repeat steps (22) through (24) until specified readings are obtained.
- (26) Set TANK 2 repeater indicator pre-select (rim pointer) successively at * 6,000, 12,000, and 18,000 pounds; ** 3,000, 7,000, and 10,000 kgs; or *** 6,000, 14,000, and 20,000 pounds.
- (27) Using the test box, adjust the repeater indicators to the above corresponding values and listen for NO. 2 TANK fuel shutoff solenoids to actuate. Solenoids should actuate at set value * (± 100) pounds, ** (± 50) kgs, or *** (± 100) pounds.
- (28) Check and record the indicator EMPTY and FULL capacitance values as follows:
 - a. Disconnect three test leads at ship's harness side of connectors.
 - b. Set COMPENSATOR control on tester at 25.5 uuf.
 - c. Adjust UNITS control on tester until indicator reads zero. This value should be 445.2 (± 5.0) uuf. Do not adjust zero adjust screw on indicator.
 - d. Record EMPTY capacitance value in ships log book.
 - e. Set COMPENSATOR control on tester at 52.1 uuf.
 - f. Adjust UNITS control on tester until indicator reads * 23,500 pounds, ** 11,000 kgs, or *** 25,000 pounds, FULL capacitance value should be capacitance recorded in step (28) d. plus * 502.4 uuf, ** 519.2 uuf, or *** 535.3 uuf. Do not adjust FULL adjustment screw on indicator.
 - g. Record FULL capacitance value in ship's log.

* Applicable to airplanes CV1 through CV25 only.

** Applicable to airplanes CV26 through CV34 only.

*** Applicable to airplanes CV35 through CV37 only.

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- (29) Open FUEL QUANTITY INDICATOR TANK NO. 2 circuit breaker.
- (30) Repeat steps (16) through (29) substituting the components for tank No. 3.
- (31) Disconnect electrical connector plug from AUX CTR SEC TANK indicator on flight engineer's panel.
- (32) Connect test adapter harness between AUX CTR SEC TANK indicator and ship's harness as shown on Figure 201.
- (33) Connect tester to adapter harness.
- (34) Place all tester knobs at zero position.
- (35) Close FUEL QUANTITY INDICATORS CTR TANK circuit breaker.
- (36) AUX CTR SEC TANK indicator shall indicate zero.
- (37) Set COMPENSATOR control on tester at 26.6 uuf.
- (38) Set UNITS control on tester at * 418.7 uuf, ** 451.9 uuf, or *** 465.8 uuf.
- (39) AUX CTR SEC TANK indicators and both CENTER SECTION AUX repeater indicators shall indicate * 22,500 pounds, ** 11,000 kgs, or *** 25,000 pounds. Adjust indicators to these values at the FULL adjustment screw, on the back of each indicator, if necessary.
- (40) Repeat steps (37) through (39) until specified readings are obtained.
- (41) Set CENTER SECTION AUX repeater indicators (both left-hand and right-hand refuel control panels) pre-select (rim pointer) successively at * 6,000, 12,000, and 18,000 pounds; ** 3,000, 7,000, and 10,000 kgs; or *** 6,000, 14,000, and 20,000 pounds.
- (42) Using the test box, adjust the repeater indicators successively to values given in preceding step and listen for the left-hand center tank shutoff solenoids, and the right-hand center tank shutoff solenoids, to actuate. Solenoids should actuate at set value * (± 100) pounds, ** (± 50) kgs, or *** (± 100) pounds.
- (43) Check and record the indicator EMPTY and FULL capacitance values as follows:

* Applicable to airplanes CV1, CV2, and CV5 through CV24.

** Applicable to airplanes CV26 through CV34.

*** Applicable to airplanes CV3, CV4, CV25, and CV35 and on.

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- a. Disconnect three test leads at ship's harness side of connector.
 - b. Set COMPENSATOR control on tester at 25.5 uuf.
 - c. Adjust UNITS control on tester until indicator reads zero. This value should be 365.3 (± 3.0) uuf. Do not adjust zero adjust screw on indicator.
 - d. Record EMPTY capacitance value in ships log book.
 - e. Set COMPENSATOR control on tester at 50.5 uuf.
 - f. Adjust UNITS control on tester until indicator reads * 22,500 pounds, ** 11,000 kgs, or *** 25,000 pounds. FULL capacitance value should be capacitance recorded in step (43)d. plus * 418.7 uuf, ** 451.9 uuf, or *** 465.8 uuf. Do not adjust FULL adjustment screw on indicator.
 - g. Open FUEL QUANTITY INDICATOR CTR TANK circuit breaker.
- F. Calibrate Tank and Repeater Indicators - Alternate Method (substitute capacitance).
- (1) Disconnect electrical connector plug from TANK NO. 1 indicator on flight engineer's panel.
 - (2) Connect test harness between TANK NO. 1 indicator and ship's harness as shown on Figure 201, except disconnect three cables of test harness connecting tee fitting to pins D, H, and COAX on ship's side of harness.
 - (3) Close FUEL QUANTITY INDICATOR TANK 1 circuit breaker.
 - (4) Set COMPENSATOR control knob on tester to 52.1 uuf, and if tank is empty adjust the UNITS capacitance control until NO. 1 tank indicators read zero. If the tank contains fuel, set the UNITS control to the actual dry capacitance. If the UNITS dry capacitance is not known set the UNITS control to 421.6 uuf.
 - (5) Record the actual UNITS capacitance setting.
 - (6) Increase tester UNITS control setting to * 858.5 (± 8.5) uuf, ** 979.9 (± 8.5) uuf, or *** 997.1 (± 9.0) uuf.
 - (7) Record the actual FULL value.

* Applicable to airplanes CV1, CV2, and CV5 through CV24.

** Applicable to airplanes CV26 through CV34.

*** Applicable to airplanes CV3, CV4, CV25, and CV35 and on.

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- (8) Adjust No. 1 TANK indicator and NO. 1 TANK repeater indicator full adjustment until the indicators read * 19,000 pounds, ** 11,000 kgs, or *** 25,000 pounds.
 - (9) Repeat steps (4) through (8) until specified readings are obtained without further adjustment.
 - (10) If fuel tank is empty, check pre-select circuit by successively setting the repeater indicator pre-select rim pointer to * 5,000 and 15,000 pounds, ** 5,000 and 10,000 kgs, or *** 10,000 and 20,000 pounds and using the test box to run each indicator to these values. The shutoff solenoids should actuate at the pre-selected values * (± 100) pounds, ** (± 50) kgs, or *** (± 100) pounds.
 - (11) Open FUEL QUANTITY INDICATOR TANK 1 circuit breaker.
 - (12) Repeat steps (1) through (11) substituting the components for tank No. 4.
 - (13) Repeat steps (1) through (11) for tanks No. 2 and 3 except substitute 445.2 uuf for 421.6 uuf; * 947.6 (± 8.5) uuf for 858.5 (± 8.5) uuf, ** 964.4 (± 8.5) uuf for 979.9 (± 8.5) uuf, *** 980.5 (± 8.5) uuf for 997.1 (± 8.5) uuf and * 23,500 pounds for 19,000 pounds.
 - (14) Repeat steps (1) through (11) for center tanks, except substitute 50.5 uuf for 52.1 uuf, 365.3 (± 3.0) uuf for 421.6 (± 8.5) uuf, * 784.0 (± 3.0) uuf for 858.5 (± 8.5) uuf, ** 817.2 (± 3.0) uuf for 979.9 (± 8.5) uuf, *** or 831.1 (± 3.0) uuf for 997.1 (± 9.0) uuf; and * 22,500 pounds for 19,000 pounds.
- G. (Applicable to Airplanes CV26 and on only) Calibrate Pilots' Total Fuel Indicator
- (1) Connect test adapter harness assembly as shown (typical) on Figure 202 to each of the five indicators on the flight engineer's panel.
 - (2) Close FUEL QUANTITY INDICATOR circuit breakers TANK 1, TANK 2, TANK 3, TANK 4 and CTR TANK; and FUEL QTY TOTAL circuit breakers.
 - (3) Check that all five tank indicators read zero. If any indicators do not read zero, adjust the potentiometer (variable resistor) on the corresponding test adapter to obtain a zero reading on the indicator.

* Applicable to airplanes CV1, CV2, and CV5 through CV24.

** Applicable to airplanes CV26 through CV34.

*** Applicable to airplanes CV3, CV4, CV25, and CV35 and on.

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NOTE: Do not readjust the zero adjust screw on the indicator to obtain a zero reading.

- (4) Check that the pilots' total fuel indicator reads zero; if it does not read zero, adjust the EMPTY adjustment screw on the indicator until a zero reading is obtained.
- (5) Adjust the test adapter potentiometers so that TANK NO. 1, and TANK NO. 4 indicators indicate ** 10,000 Kgs, and *** 22,000 pounds each; TANK NO. 2, TANK NO. 3, and CTR TANK indicators indicate ** 11,000 kgs, and *** 25,000 pounds each.
- (6) Check that pilots' total fuel indicator reads ** 53,000 kgs, or *** 129,000 (± 1290) pounds. If reading is not as specified, make adjustments at the indicator FULL adjustment screw until the specified reading is obtained.
- (7) Readjust adapter potentiometers for three-quarters tank readings. TANK NO. 1 and TANK NO. 4 indicators shall read ** 7,500 kgs, or *** 16,500 pounds each; TANK NO. 2, TANK NO. 3, and CTR TANK indicators shall read ** 8,200 kgs, or *** 18,000 pounds each.
- (8) Check that pilots' total fuel indicator reads ** 39,600 (± 396) kgs, or *** 87,000 (± 870) pounds.
- (9) Readjust adapter potentiometers for one-half tank readings. TANK NO. 1 and TANK NO. 4 indicators shall read ** 5,000 kgs, or *** 10,000 pounds each; TANK NO. 2, TANK NO. 3, and CTR TANK indicators shall read ** 5,500 kgs, or *** 12,000 pounds each.
- (10) Check that pilots' total fuel indicator reads ** 26,500 (± 265) kgs or *** 56,000 (± 560) pounds.
- (11) Readjust adapter potentiometers for one-fourth tank readings. TANK NO. 1 and TANK NO. 4 indicators shall read ** 2,500 kgs, or *** 5,000 pounds each; TANK NO. 2, TANK NO. 3, and CTR TANKS indicator shall read ** 2,700 kgs, or *** 7,000 pounds each.
- (12) Check that pilots' total fuel indicator reads ** 13,100 (± 130) kgs or *** 31,000 (± 310) pounds each.
- (13) Open circuit breakers closed in step G. (2).
- (14) Remove external electrical power from airplane.
- (15) Restore circuits to normal.

2. Adjustment/Test - System Dry Capacitance Check

A. Equipment Required. Tester - Simmonds No. 387016, or equivalent.

**Applicable to airplanes CV26 through CV34 only.
***Applicable to airplanes CV35 through CV37 only.

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B. Prepare for System Dry Capacitance Check.

- (1) Defuel airplane; refer to Chapter 12, SERVICING.
- (2) Open FUEL QUANTITY INDICATORS and FUEL QTY TOTAL circuit breakers. Attach warning tags to circuit breaker panel.

C. Check System Dry Capacitance. (For Trouble Shooting Reference Only.)

- (1) Disconnect electrical plug from tank No. 1 indicator on flight engineer's fuel control panel.
- (2) Using test bridge (part of tester) measure capacitance between pin B and pin H while pin A and pin D are grounded. Capacitance shall be 421.6 (± 8.0) uuf. Record actual capacitance.
- (3) Measure capacitance between pin B and pin D while pin A and pin H are grounded. Capacitance shall be 25.5 (± 0.5) uuf. Record actual capacitance.
- (4) Repeat steps (1) through (3) for tank No. 4.
- (5) Repeat steps (1) through (3) for tanks No. 2 and 3 except substitute 445.2 (± 5.0) uuf for 421.6 (± 8.0) uuf.
- (6) Disconnect electrical plug from center tank indicator and ground pin D of plug. Measure capacitance between pins F and B. Capacitance shall be 365.3 (± 3.7) uuf. Record actual capacitance.

NOTE: If separate capacitance values are required for main tank fuel probes and replenishment tank fuel probes, refer to Adjustment/Test Main Tank/Replenishment Tank Center Tank/Antishock Body Dry Capacitance Check.

- (7) Reconnect electrical plugs to fuel quantity indicators.
- (8) Close circuit breakers opened in step B. (2); remove warning tags.
- (9) Refuel airplane; refer to Chapter 12, SERVICING.

3. Adjustment/Test - Main Tank/Replenishment Tank Center Tank/Anti-Shock Body Dry Capacitance Check

A. Equipment Required. Tester - Simmonds No. 387016, or equivalent.

B. Prepare for Main Tank/Replenishment Tank Center Tank/Anti-Shock body/ Dry Capacitance Check.

- (1) Defuel Airplane; refer to Chapter 12, SERVICING.
- (2) Open FUEL QUANTITY INDICATORS and FUEL QTY SEL circuit breakers. Attach warning tags to circuit breaker.

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- (3) Disconnect all electrical plugs from fuel gaging transfer switch box in electronics/electrical compartment, and from all fuel quantity indicators on flight engineer's fuel control panel.

C. Check Dry Capacitance of Main Tank, Replenishment Tank, Center Tank, and Anti-Shock Body Tank.

- (1) Using test bridge (part of tester), measure capacitance between the coax cable and pin given, simultaneously grounding specified pins.

NOTE: Test bridge must be grounded to airplane structure during this capacitance check.

- (a) For No. 1 anti-shock body, ground wires for pins D and E at transfer switch box and wire for pin D at tank No. 1 indicator. At transfer switch box, measure capacitance between coax cable E196A and wire for pin F. Capacitance shall be 83.1 (± 0.8) uuf. Record actual capacitance in ship's log.
- (b) For No. 1 replenish tank, ground wires for pins E and F at transfer switch box and wire for pin D at tank No. 1 indicator. At transfer switch box, measure capacitance between coax cable E196A and wire for pin D. Capacitance shall be 87.2 (± 0.9) uuf. Record actual capacitance in ship's log.
- (c) For No. 1 main tank, ground wires for pins D and F at transfer switch box and wire for pin D at tank No. 1 indicator. At transfer switch box, measure capacitance between coax cable E196A and wire for pin E. Capacitance shall be 251.3 (± 2.5) uuf. Record actual capacitance in ship's log.
- (d) For No. 2 anti-shock body, ground wires for pins A and B at transfer switch box and wire for pin D at tank No. 2 indicator. At transfer switch box, measure capacitance between coax cable E202A and wire for pin C. Capacitance shall be 56.8 (± 0.5) uuf. Record actual capacitance in ship's log.
- (e) For No. 2 replenish tank, ground wires for pins B and C at transfer switch box and wire for pin D at tank No. 2 indicator. At transfer switch box, measure capacitance between coax cable E202A and wire for pin A. Capacitance shall be 182.4 (± 1.9) uuf. Record actual capacitance in ship's log.
- (f) For No. 2 main tank, ground wires for pins A and C at transfer switch and wire for pin D at tank No. 2 indicator. At transfer switch box, measure capacitance between coax cable E202A and wire for pin B. Capacitance shall be 206.0 (± 2.5) uuf. Record actual capacitance in ship's log.

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- (g) For No. 3 anti-shock body, ground wires for pins G and H at transfer switch box and wire for pin D at tank No. 3 indicator. At transfer switch box, measure capacitance between coax cable E208A and wire for pin J. Capacitance shall be 56.8 (± 0.5) uuf. Record actual capacitance in ship's log.
 - (h) For No. 3 replenish tank, ground wires for pins H and J at transfer switch box and wire for pin D at tank No. 3 indicator. At transfer switch box, measure capacitance between coax cable E208A and wire for pin G. Capacitance shall be 182.4 (± 1.8) uuf. Record actual capacitance in ship's log.
 - (i) For No. 3 main tank, ground wires for pins G and J at transfer switch box and wire for pin D at tank No. 3 indicator. At transfer switch box, measure capacitance between coax cable E208A and wire for pin H. Capacitance shall be 206.0 (± 2.5) uuf. Record actual capacitance in ship's log.
 - (j) For No. 4 anti-shock body, ground wires for pins K and L at transfer switch box and wire for pin D at tank No. 4 indicator. At transfer switch box, measure capacitance between coax cable E214A and wire for pin M. Capacitance shall be 83.1 (± 0.8) uuf. Record actual capacitance in ship's log.
 - (k) For No. 4 replenish tank, ground wires for pins L and M at transfer switch box and wire for pin D at tank No. 4 indicator. At transfer switch box, measure capacitance between coax cable E214A and wire for pin K. Capacitance shall be 87.2 (± 0.9) uuf. Record actual capacitance in ship's log.
 - (l) For No. 4 main tank, ground wires for pins K and M at transfer switch box and wire for pin D at tank No. 4 indicator. At transfer switch box, measure capacitance between coax cable E214A and wire for pin L. Capacitance shall be 251.3 (± 2.5) uuf. Record actual capacitance in ship's log.
 - (m) For center section tank, ground wire for pin D at center tank indicator and measure capacitance between wires for pins F and B at indicator. Capacitance shall be 365.3 (± 3.7) uuf. Record actual capacitance in ship's log.
 - (n) For center section tank compensator, ground wire for pin F at tank indicator and measure capacitance between wires for pins B and D at indicator. Capacitance shall be 25.5 (± 0.5) uuf. Record actual capacitance in ship's log.
- (2) Reconnect electrical plugs to transfer switch box.
 - (3) Remove warning tags and close circuit breakers.
 - (4) Refuel airplane; refer to Chapter 12, SERVICING.

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4. Adjustment/Test Probe and Tank System - Insulation Measurement

A. General.

The critical insulation resistance value for satisfactory fuel gage operation is between the HiZ (coaxial) and LoZ (400 cycle) terminals. The insulation resistance value between LoZ terminal and ground, and HiZ terminal and ground is not critical and may be very low.

B. Equipment Required

- (1) External power source - 120 volt, 60 or 400 cycle, single phase ac.
- (2) Insulation Test Set - Simmonds Model No. 387044.

C. Prepare for Insulation Measurement.

WARNING: IMPROPER USE OF THIS TEST SET IN THE PRESENCE OF FUEL OR FUEL VAPORS IS HAZARDOUS. THE TEST SET MUST BE TURNED OFF BEFORE MAKING OR BREAKING CONNECTIONS. CONNECTIONS MUST BE SECURE AND INSULATED FROM EACH OTHER SO THE 100 VOLT DC OUTPUT CANNOT CAUSE ARCING. DO NOT TAKE TEST SET INTO AN EXPLOSIVE ATMOSPHERE.

- (1) Connect test set to 120 volt, 60 or 400 cps, ac power source.
- (2) Turn range switch to TEST.

NOTE: The mode switch is inoperative when the range switch is in the TEST position.

- (3) Disconnect all leads from test set terminals.
- (4) Turn test set power switch to ON and allow one minute warmup.
- (5) Adjust SET ZERO knob for a meter range reading of 1.0 megohm.
- (6) Turn test set power switch to OFF.
- (7) Reconnect leads to test set.

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D. Measure Probe Insulation Resistance (see Figure 203)

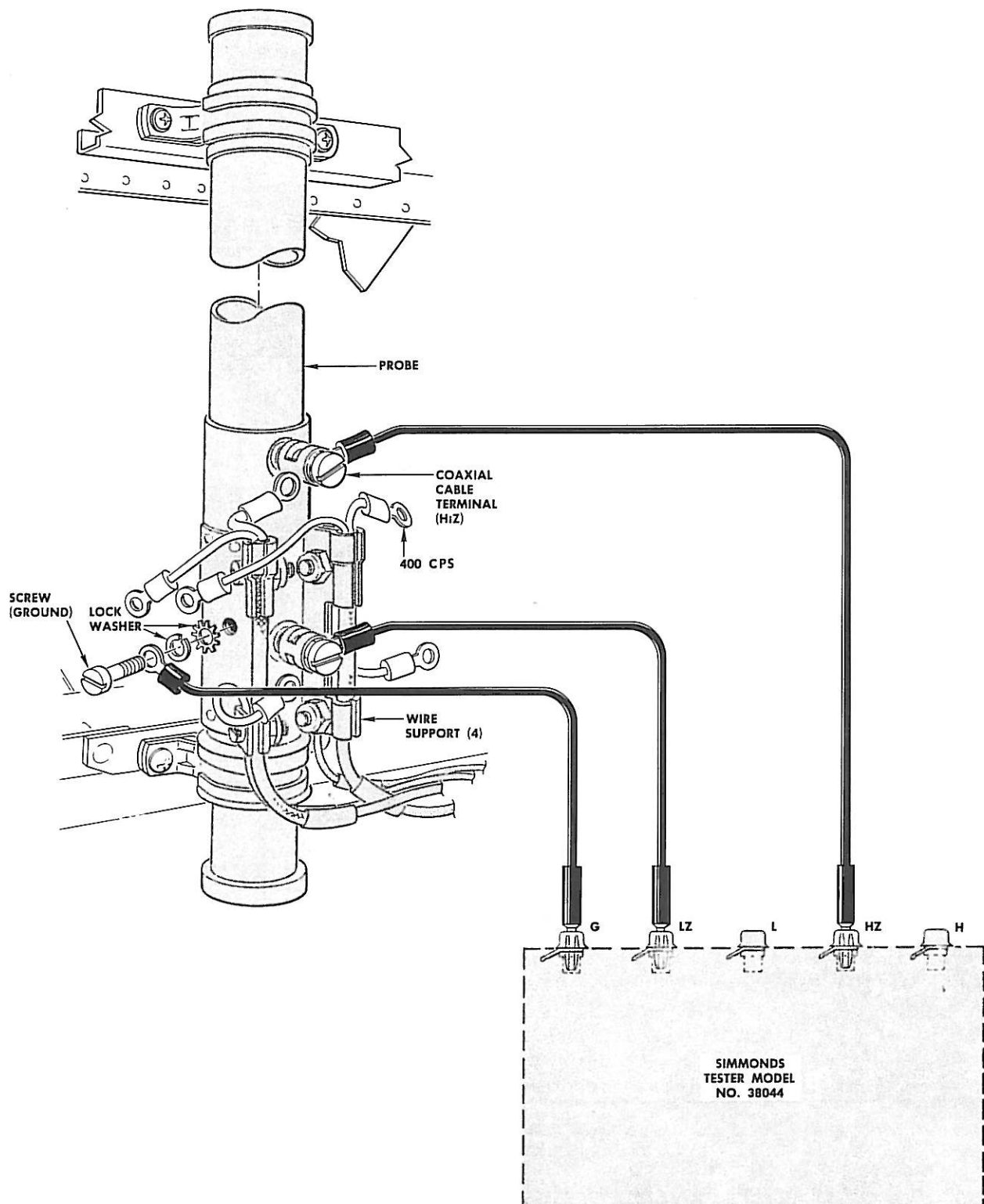
- (1) Open FUEL QUANTITY INDICATOR circuit breaker (on main circuit breaker panel) for tank to be tested.
- (2) Disconnect leads from all terminals of probe being tested.
- (3) Connect a lead from the probe ground screw to terminal "G" on test set.
- (4) Connect a lead from the probe coaxial cable (HiZ) terminal to terminal "HZ" on the test set.
- (5) Connect a lead from the probe 400 cycle (LoZ) terminal to terminal "LZ" on the test set.
- (6) Turn range switch to TEST.

NOTE: The mode switch is inoperative when the range switch is in the TEST position.

- (7) Repeat steps 4.C.(4) and 4.C.(5) with leads connected.
- (8) Adjust meter for maximum needle deflection by turning the range switch to X1, X10, or X100 position.
 - (a) If range switch is in X1 position, meter reading is actual resistance.
 - (b) If range switch is in X10 position, meter reading times ten is actual resistance.
 - (c) If range switch is in X100 position, meter reading times one hundred is actual resistance.
- (9) Measure resistance "H-G" (HiZ terminal to ground), "L-G" (LoZ terminal to ground), and "L-H" (LoZ terminal to HiZ terminal) using mode switch and range switch. Minimum required resistance readings are contained in paragraph 4.F.
- (10) Turn test set power switch to OFF.
- (11) Disconnect leads connected in steps 4.D.(3), (4), and (5).
- (12) Reconnect leads disconnected in step 4.D.(2).
- (13) Close circuit breaker opened in step 4.D.(1).

E. Measure Tank System Insulation (see Figure 204).

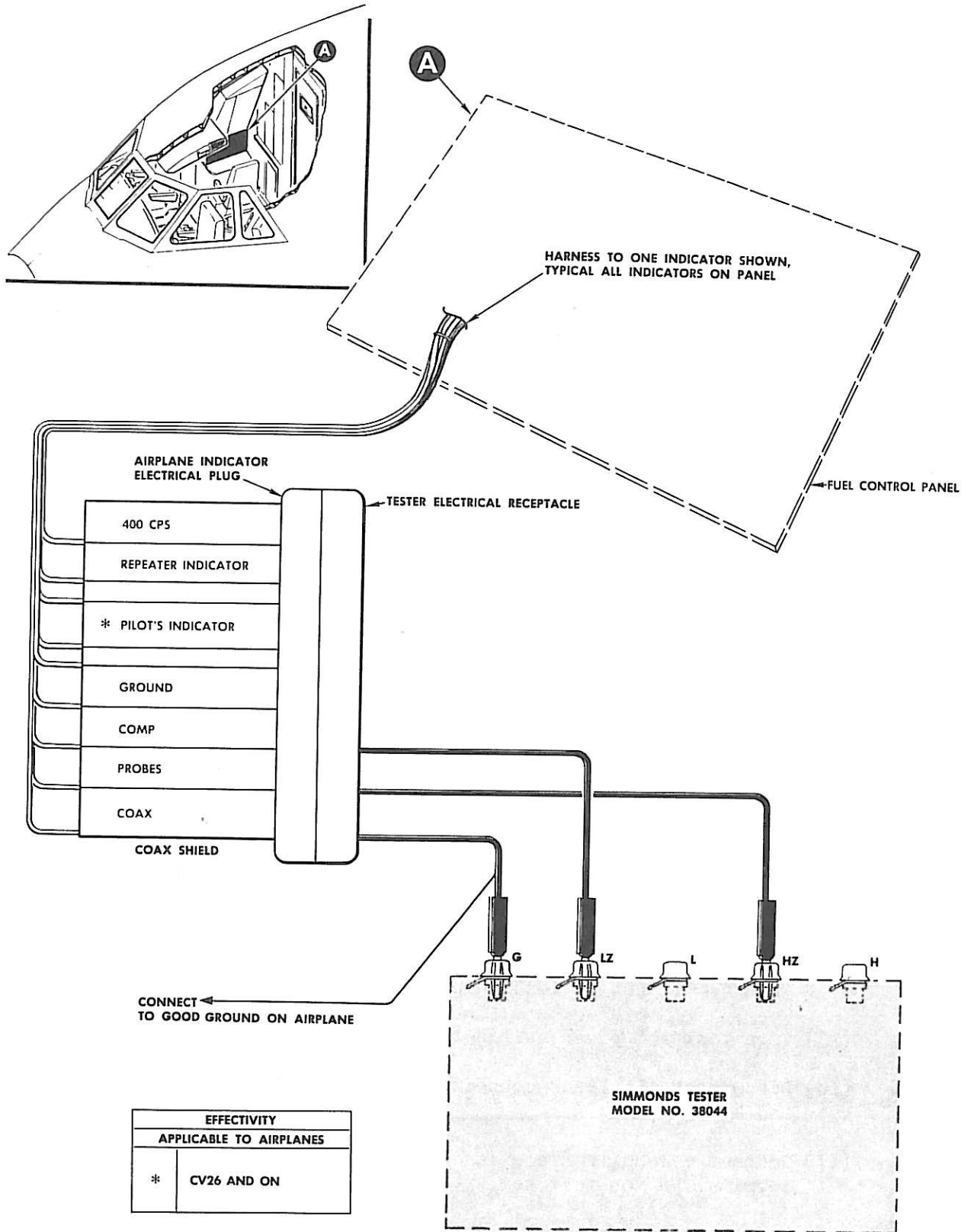
- (1) Open fuel FUEL QUANTITY INDICATOR circuit breaker (on main circuit breaker panel) for tank to be tested.



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- (2) Disconnect electrical plug from indicator of tank to be tested.
- (3) Connect a mating receptacle to plug disconnected from indicator. Make all connections to the base of the receptacle, to avoid damage to the plug sockets.
- (4) Connect lead from the coax shield at the receptacle to terminal "G" on the test set.
- (5) Connect a lead from the coax center conductor at the receptacle to terminal "HZ" on test set.
- (6) Connect a lead from receptacle pin "H" to terminal "LZ" on test set.
- (7) Connect a lead from terminal "G" on test set to a good ground on the airplane.
- (8) Turn range switch on test set to TEST position.

NOTE: The mode switch is inoperative when the range switch is in the TEST position.
- (9) Repeat steps 4.C.(4) and 4.C.(5) with leads connected.
- (10) Measure circuit resistances as described in steps 4.D.(8) and 4.D.(9). Resistance "H-G" shall not be less than 1.0 megohm. Resistance "L-G" shall not be less than 1.0 megohm. Resistance "L-H" shall not be less than 210 megohms.
- (11) Turn test set power switch to OFF.
- (12) Disconnect lead from receptacle pin "H" and connect it to receptacle pin "D".
- (13) Repeat step 4.E.(9).
- (14) Measure circuit resistances as described in steps 4.D.(8) and 4.D.(9). Resistance "H-G" shall not be less than 1.0 megohm. Resistance "L-G" shall not be less than 1.0 megohm. Resistance "L-H" shall not be less than 800 megohms.
- (15) Turn test set power switch to OFF.
- (16) Disconnect all leads connected in steps 4.D.(4), 4.D.(5), 4.D.(7), and 4.D.(12).
- (17) Connect a lead from coaxial conductor shield at receptacle, to terminal "H" on test set.
- (18) Connect a lead from receptacle pin "J" to terminal "L" on test set.
- (19) Repeat steps 4.C.(4) and 4.C.(5) with leads connected, and range switch in TEST position.

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NOTE: The mode switch is inoperative when the range switch is in the TEST position.

- (20) Measure resistance as described in step 4.D.(8). Reading shall not be less than 10.0 megohms.
- (21) Turn test set power switch to OFF.
- (22) Remove test leads and receptacle.
- (23) Reconnect electrical plug to fuel quantity indicator.
- (24) Close FUEL QUANTITY INDICATOR circuit breaker opened in step 4.e.(6).

F. Minimum Resistance Values (see Figure 2).

- (1) Minimum resistance values for individual probes are applicable whether the probe is wet or dry. The minimum resistance from "L to G" and "H to G" in all probes is nine megohms; minimum resistance from "L to G" and "H to G" in all compensators is one megohm. The minimum resistance values from "L to H" for individual probes and compensators follows. Probe number corresponds to the probe number shown on Figure 2.

<u>PROBE NUMBER</u> <u>(FIGURE 2)</u>	<u>RESISTANCE</u> <u>"L to H"</u>	<u>PROBE NUMBER</u> <u>(FIGURE 2)</u>	<u>RESISTANCE</u> <u>"L to H"</u>
1	5000 megohms	14	2050 megohms
2	5100 megohms	15	5000 megohms
3	4550 megohms	16	2720 megohms
4	5000 megohms	17	3080 megohms
5	5000 megohms	18	1410 megohms
6	5000 megohms	19	2190 megohms
7	2820 megohms	20	1740 megohms
8	3220 megohms	21	2040 megohms
9	2580 megohms	22	1450 megohms
10	1635 megohms	23	1790 megohms
11	2340 megohms	24	1510 megohms
12	2520 megohms	25	2260 megohms
13	3150 megohms	26	1450 megohms

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<u>PROBE NUMBER</u> <u>(FIGURE 2)</u>	<u>RESISTANCE</u> <u>"L to H"</u>	<u>PROBE NUMBER</u> <u>(FIGURE 2)</u>	<u>RESISTANCE</u> <u>"L to H"</u>
27	3500 megohms	30	1205 megohms
28	1480 megohms	31	1325 megohms
29	1142 megohms	32	(Compensator 800 megohms)

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FUEL QUANTITY PROBES - MAINTENANCE PRACTICES

1. Removal/Installation Fuel Quantity Probe (see Figure 201)

A. Equipment Required - None.

B. Prepare for Replacement of Probe.

(1) Defuel corresponding wing tank; refer to Chapter 12, SERVICING.

(2) Inert tank; refer to 28-1-0.

(3) Remove access panel nearest probe; refer to 28-6-1, Figure 201.

WARNING: OBSERVE TANK ENTRANCE PRECAUTIONS: REFER TO 28-1-0.

C. Remove Probe.

(1) Disconnect electrical wires from probe.

(2) Remove two attaching clamps and remove probe. (Retain clamps and spacers for installation.)

CAUTION: HANDLE PROBES WITH CARE. DROPPING MAY DAMAGE CAPACITANCE CHARACTERISTICS OF UNIT. AVOID DAMAGE TO EXTERIOR INSULATING FINISH.

D. Install Probe.

(1) Position probe and install spacers and attachment clamps; install lower clamp first.

(2) Position electrical wiring in probe wiring supports; do not tighten supports at this time.

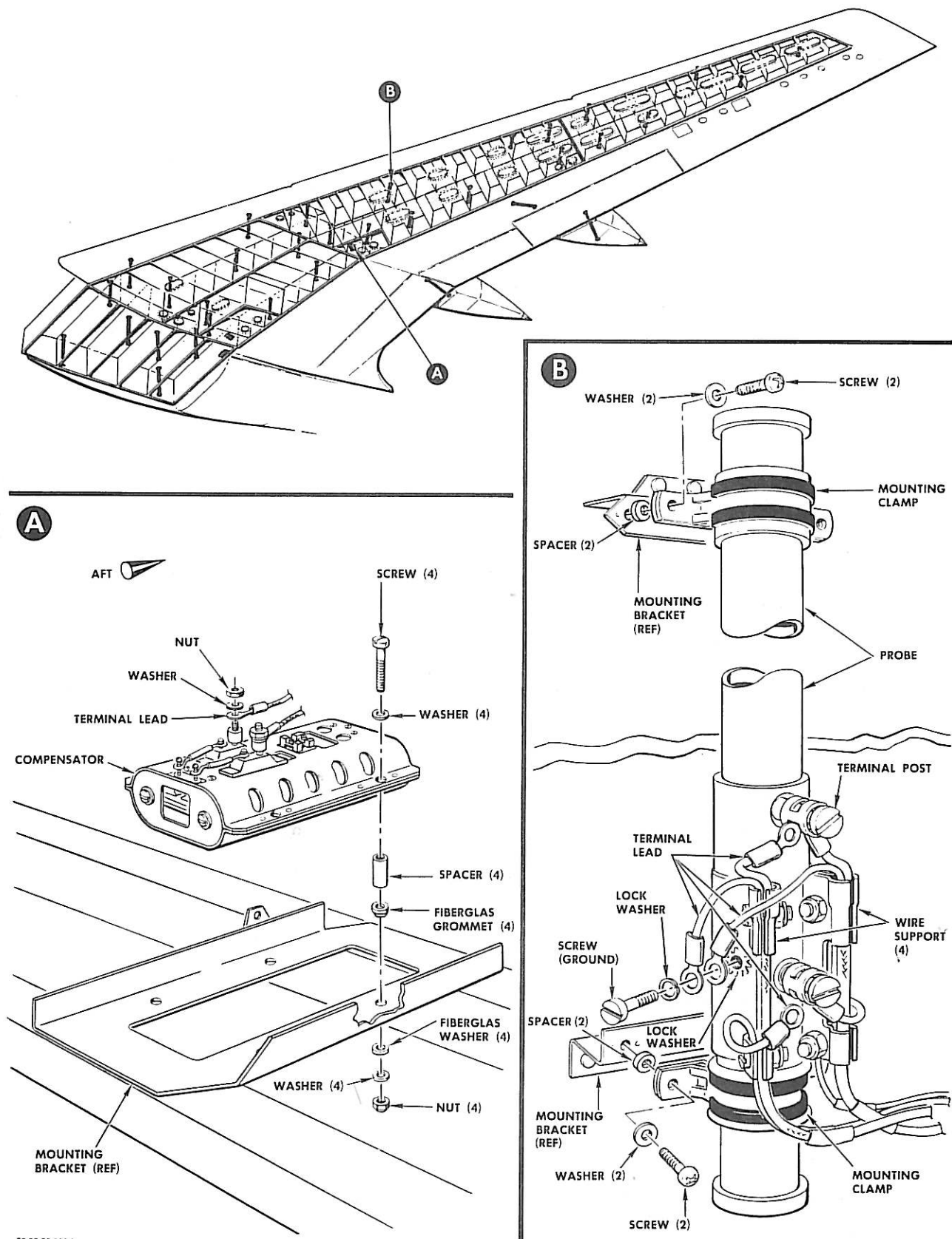
CAUTION: PROBE MUST NOT CONTACT STRUCTURE OR TUBING AT ANY POINT.

(3) Connect wires to probe terminals and tighten wiring supports.

(4) Calibrate system; refer to 28-6-0.

(5) Clean tank; refer to 28-1-0.

(6) Refuel airplane; refer to Chapter 12, SERVICING.



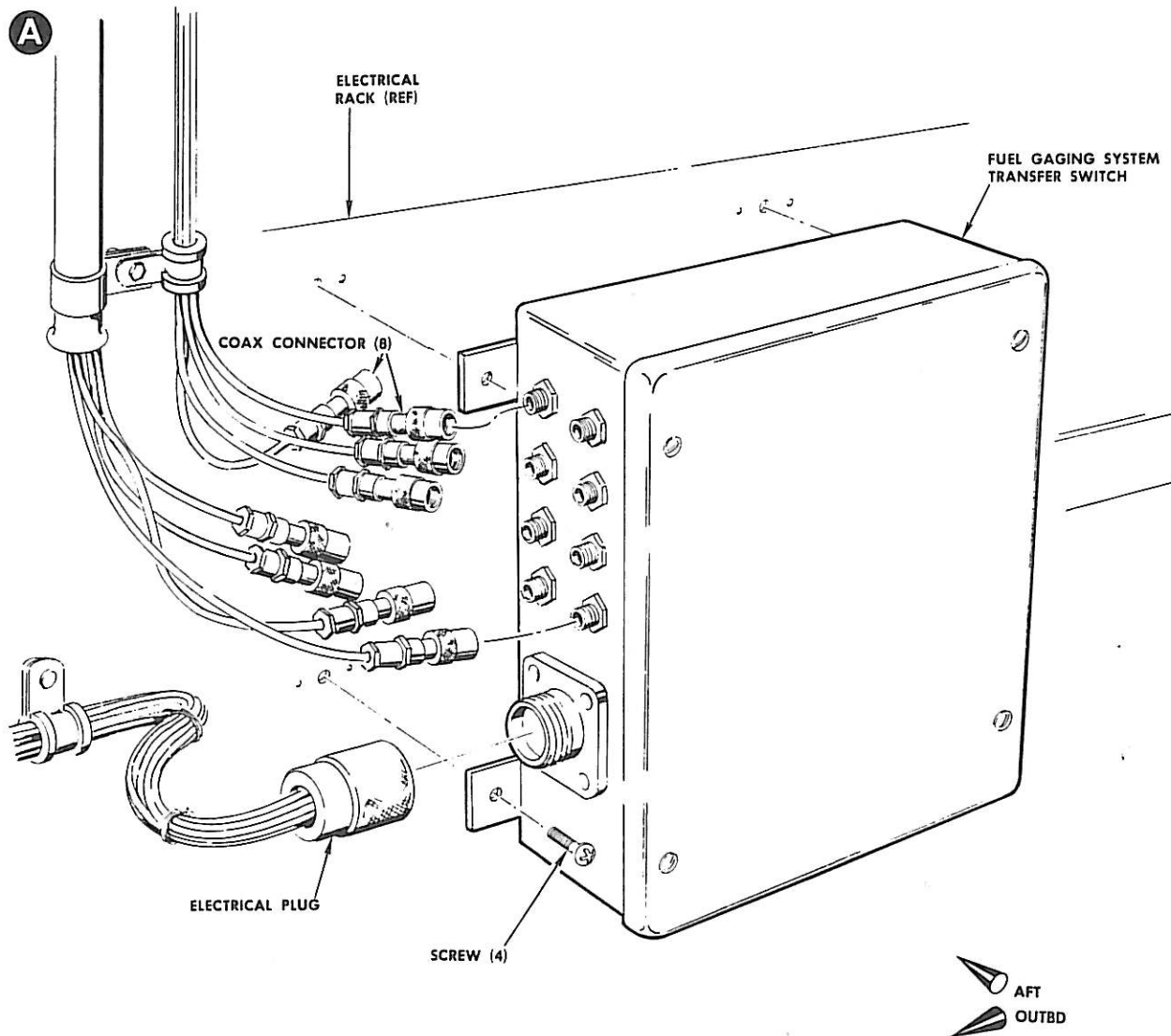
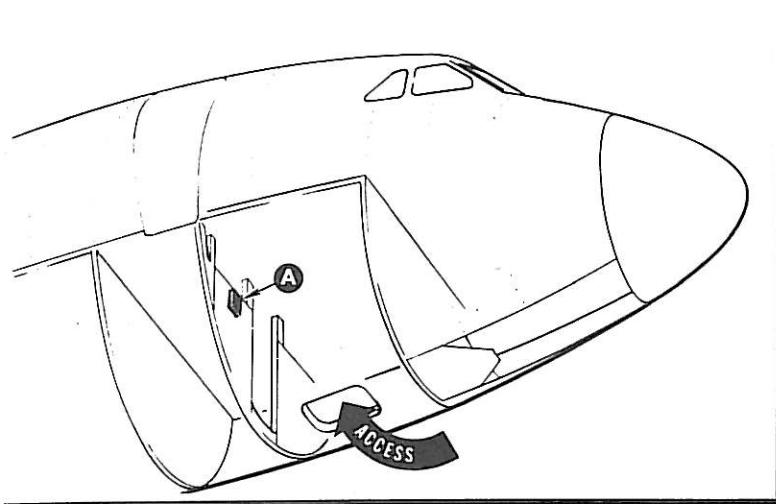
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FUEL GAGING TRANSFER SWITCH BOX - MAINTENANCE PRACTICES

1. Removal/Installation Fuel Gaging Transfer Switch Box (see Figure 201)
 - A. Equipment Required - None.
 - B. Prepare for Replacement of Transfer Switch Box.
 - (1) Open FUEL QUANTITY INDICATOR and FUEL QTY SEL circuit breakers on main circuit breaker panel and attach warning tags.
 - C. Remove Transfer Switch Box.
 - (1) Disconnect electrical plug from transfer switch box.
 - (2) Disconnect and tag eight coax cables from transfer switch box.
 - (3) Remove four attaching screws and remove transfer switch box.
 - D. Install Transfer Switch Box.
 - (1) Position transfer switch box and install four attaching screws.
 - (2) Connect eight coax cables, as tagged, to transfer switch box.
 - (3) Connect electrical plug to transfer switch box.
 - (4) Remove warning tags and close circuit breakers.

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FUEL QUANTITY COMPENSATORS - MAINTENANCE PRACTICES

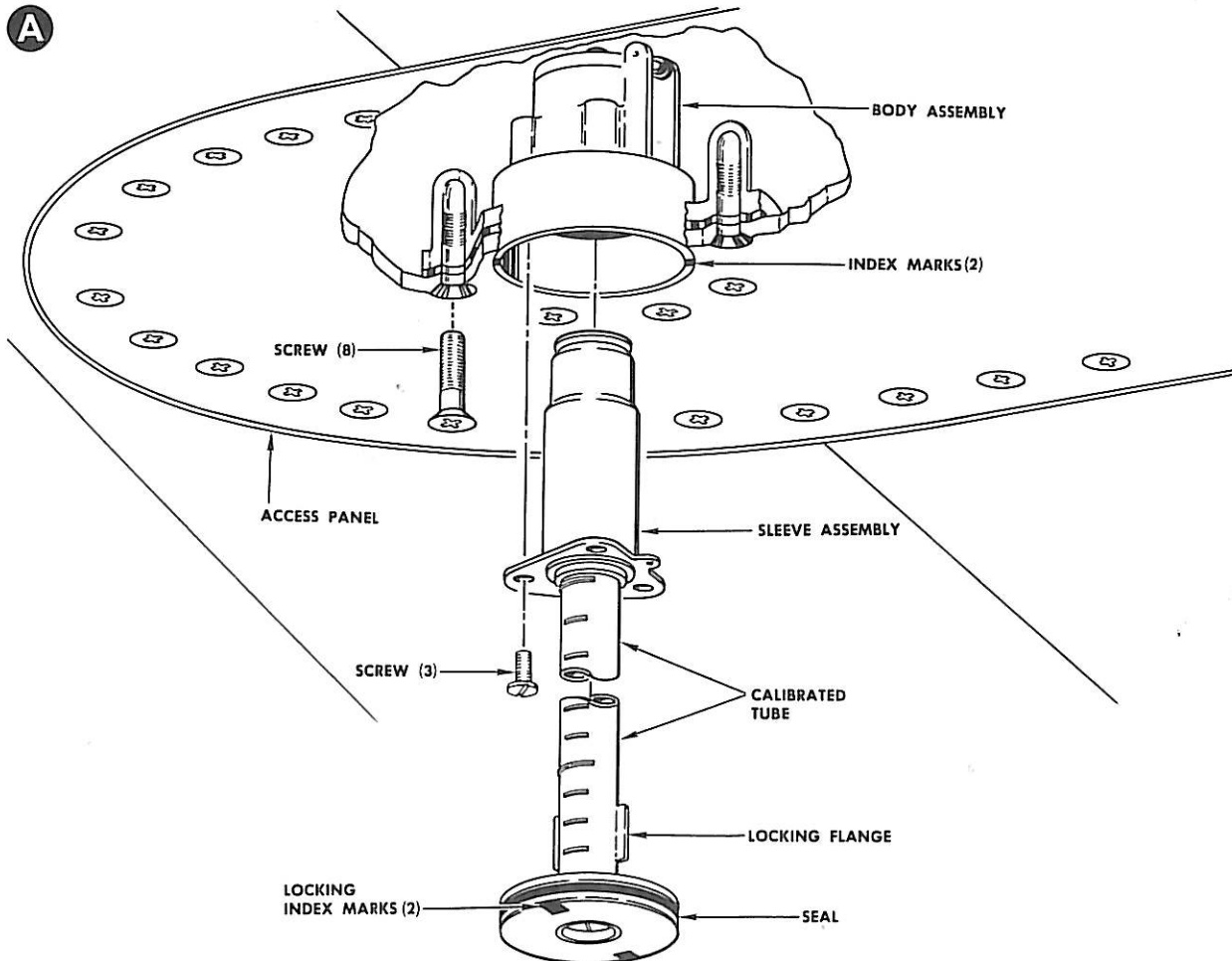
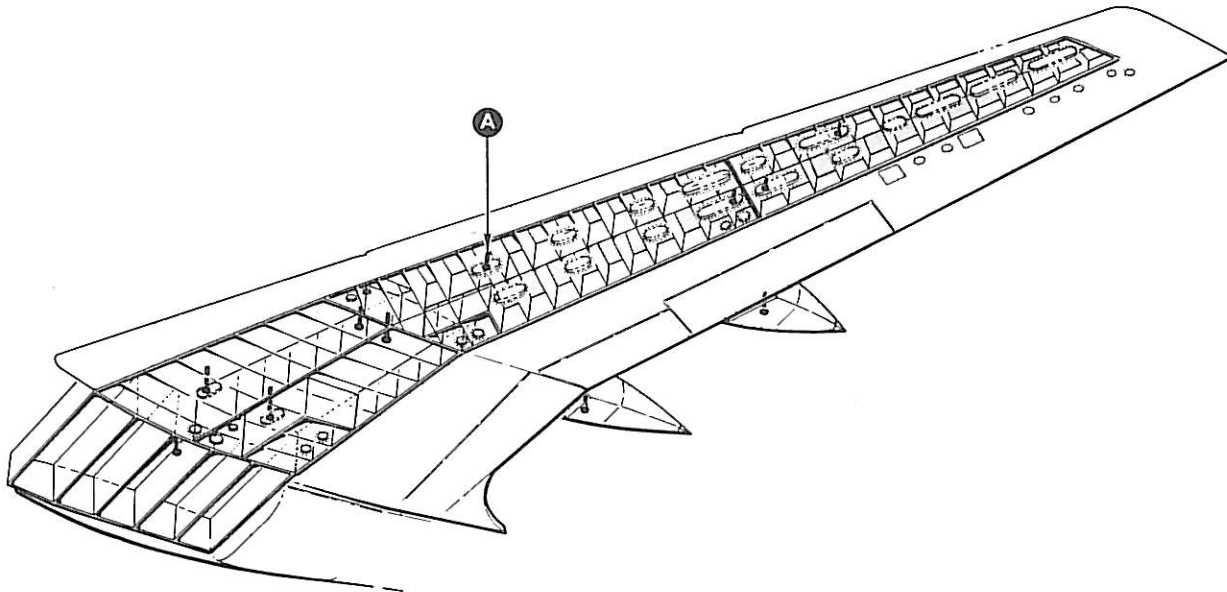
1. Removal/Installation Fuel Quantity Compensator (refer to 28-6-1, Figure 201)
 - A. Equipment Required - None.
 - B. Prepare for Replacement of Compensator.
 - (1) Defuel corresponding wing tank; refer to Chapter 12, SERVICING.
 - (2) Inert tank; refer to 28-1-0.
 - (3) Remove access door nearest compensator; refer to 28-6-1, Figure 201.

WARNING: OBSERVE TANK ENTRANCE PRECAUTIONS; REFER TO 28-1-0.
 - C. Remove Compensator.
 - (1) Disconnect electrical wires from compensator.
 - (2) Remove four attaching screws and remove compensator.
 - D. Install Compensator.
 - (1) Position compensator on bracket and install four attachment screws. With each screw, assemble the washers, grommet, spacer and nut in the relationship shown in 28-6-1, Figure 201, when installing.
 - (2) Connect electrical wires to compensator.
 - (3) Calibrate system; refer to 28-6-0.
 - (4) Clean tank; refer to 28-1-0.
 - (5) Refuel tanks; refer to Chapter 12, SERVICING.

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LIQUID SIGHT GAGES (DRIP STICK) - MAINTENANCE PRACTICES

1. Removal/Installation Calibrated Tube and Sleeve Assembly (see Figure 201)
 - A. Equipment Required.
 - (1) Accessory Products Co., tool No. 704400.
 - (2) Petrolatum, Specification VV-P-236, or equivalent.
 - B. Remove Calibrated Tube and Sleeve Assembly.
 - (1) Using tool No. 704400, extend calibrated tube FULLY downward.
 - (2) Remove three screws attaching sleeve assembly to body assembly.
 - (3) Pull calibrated tube and sleeve assembly downward and remove.
 - (4) Cover opening in wing lower surface to prevent foreign matter from entering housing.
 - C. Install Calibrated Tube and Sleeve Assembly.
 - (1) Make sure calibrated tube and sleeve assembly is clean, then lubricate sleeve assembly exterior with petrolatum, Specification VV-P-236, or equivalent.
 - (2) Wipe clean interior of body assembly; if tank contains fuel use care to prevent pushing open the flapper seal and spilling fuel while wiping.
 - (3) Slide sleeve assembly to top end of calibrated tube, then insert calibrated tube and sleeve assembly into body assembly; push upward until flange seats and install three attachment screws.
 - (4) Push calibrated tube fully upward and turn clockwise until index marks align, showing unit to be properly locked.
2. Removal/Installation Body Assembly (see Figure 201)
 - A. Equipment Required - None.
 - B. Prepare for Body Assembly Replacement.
 - (1) Defuel corresponding tank; refer to Chapter 12, SERVICING.
 - (2) Inert tank; refer to 28-1-0.
 - (3) Remove panel on which sight gage body assembly is mounted.
 - (4) Cover opening in wing lower surface.



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C. Remove Body Assembly.

- (1) Remove calibrated tube and sleeve assembly; refer to 1.A. and B.
- (2) Remove eight screws attaching body assembly to panel.

D. Install Body Assembly.

- (1) Clean mating surfaces of panel, body assembly and seal. Remove any nonconducting materials from screw heads and from countersunk screw head surfaces on panel.
- (2) Position seal and body assembly on panel and install eight attachment screws.
- (3) Install panel with body assembly on wing.
- (4) Install calibrated tube and sleeve assembly; refer to 1.A. and C.

NOTE: If top end of calibrated tube does not enter bell-shaped support freely, indicating misalignment, the support may be aligned by shifting it on its slotted mounting holes. This will require entering the tank; observe all tank entrance precautions outlined in 28-1-0 when entering tank.

- (5) Refuel tank; refer to Chapter 12, SERVICING.
- (6) Check installation for leakage and freedom of movement.

3. Approved Repair Liquid Sight Gages (Drip Sticks) - Leaking Drip Stick Temporary Repair

NOTE: This repair is to be used only when a replacement drip stick is not available. Whenever a drip stick is leaking through the inner seal and there is no replacement available, perform the following:

A. Equipment Required.

- (1) Temporary plug P/N 7281997 (Accessory Products Co., 616 West Whittier Blvd., Whittier, California).

B. Install Temporary Plug.

- (1) Remove leaking drip stick; refer to Removal/Installation Liquid Sight Gage (Drip Stick).
- (2) Install temporary plug, using drip stick attaching screws.

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NOTE: Notify maintenance facility when a plug is used so that a replacement drip stick may be installed as soon as possible. Should it become necessary to use a drip stick in the plugged area, remove corresponding drip stick from opposite wing and insert in place of plug. When reading is obtained, reinstall plug and return drip stick to original position.